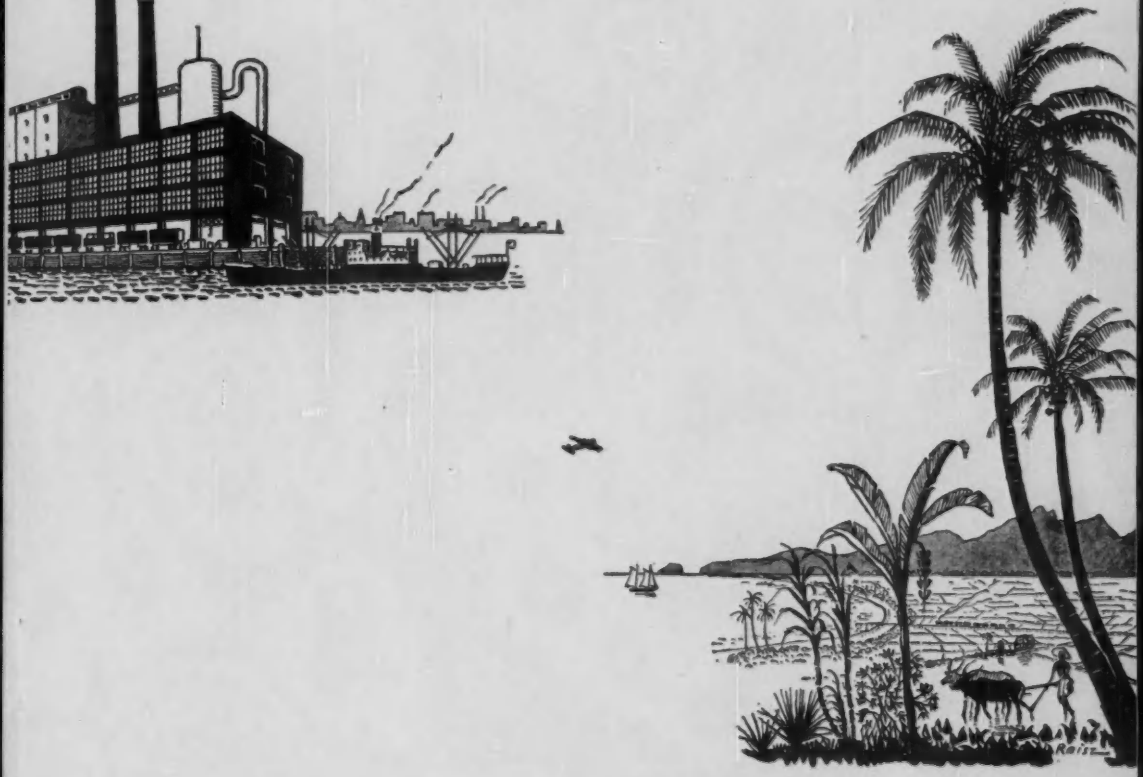
Vol. 37 No. 4
October 1961

ECONOMIC GEOGRAPHY



Clark University ~ Worcester, Mass., U.S.A.

SUBSCRIPTION INFORMATION

ECONOMIC GEOGRAPHY is a quarterly journal published by Clark University for the benefit of geographers, economists, teachers, professional and business men, and all others who are interested in the intelligent utilization of the world's resources.

Regular subscription rates (except to charter subscribers) are $7.00 per year or $13.50 for two years (plus 50c per year for mailing charges outside the United States and its Territories and Canada) payable in full in United States dollars at Worcester, Mass.

A special rate of $4.00 per year (payable in advance in United States dollars) is available to students enrolled in universities or colleges anywhere. Student subscriptions are renewable at the same rate but for only one year at a time. For such renewals a note from a department chairman is required, testifying to continued student status.

Single copies of back numbers beginning with Volume 37 will be sent to any American address for $2.00 each; to any foreign address for $2.50. (For issues of Volumes 30 through 36 the single copy cost is $1.75 domestic and $2.25 foreign. For all issues preceding Volume 30 the single copy cost is $1.50 domestic and $2.00 foreign.) The price for a complete set will be furnished upon request.

Subscribers are requested to send notices of change of address at least five weeks before they are to take effect. The old as well as the new address must be given. Claims for nonreceipt of copies must reach us within six months of date of issue.

Indexes of ECONOMIC GEOGRAPHY are issued every October for the volume just completed and are bound into the October issue. A cumulative index for Volumes 1 to 25 is available (cloth covered, $5.00; paper covered, $4.00). The articles in the magazine are also indexed in the International Index to Periodicals to be found in every United States Library.

Send all subscriptions and orders to ECONOMIC GEOGRAPHY
Clark University
Worcester 10, Mass., U.S.A.

INFORMATION FOR CONTRIBUTORS

This magazine publishes articles in the field of economic geography as well as articles in adjacent fields that contribute to an understanding of the world's economic patterns.

All articles should be typed on 8⅛ x 11 inch paper and should be double-spaced. Only one copy should be submitted. Authors are requested to send with each article a statement as to the field work, special experience, or other background on which the article is based. If an article that includes large maps or charts is being sent from overseas it is recommended that photographic reproductions of the illustrations be submitted. The originals may be requested later if the article is accepted. Authors are urged wherever possible to have maps and graphs prepared in such form that they can be reproduced without redrawing. In cases where it is necessary, a moderate amount of such work will be done at the editorial offices, but this may result in delay in publication. Delay will be avoided, also, if the author will send a caption with each illustration. All map or chart captions should show the source of data or other information unless this is already given in the illustrations. The sources of information for all tables, too, should be shown. Wherever a photograph is used that was not taken by the author, some source credit should appear in the caption.

A reasonable number of footnotes can be used with each article, but authors are requested to keep them to a minimum. Particularly, long informational footnotes should be avoided. All footnotes should be inserted between lines wherever they occur in the text rather than at the bottom of the page or at the end of an article.

Galley proof will ordinarily be submitted. Lengthy or unusual changes in proof will be charged to the author. An order blank for reprints will accompany the galley proof. Fifty reprints without covers will be furnished free to each author.

The originals of all illustrations will be destroyed within one month of publication unless their return has been specifically requested before that time. Authors will be billed for postage on all illustrative material returned.

All manuscripts submitted for publication and all books for review should be addressed to the Editor, ECONOMIC GEOGRAPHY, Clark University, Worcester 10, Mass., U.S.A.

ECONOMIC GEOGRAPHY

CONTENTS FOR OCTOBER, 1961

Merrimack Valley Manufacturing: Past and Present . . *William H. Wallace* 283

Some Aspects of the Geography of International Trade . *Andreas Grotewold* 309

Coffee Trade, Coffee Regions, and Coffee Ports in Angola *Irene S. van Dongen* 320

Food for Tahiti . . . . . *Glenn Cunningham* 347

Harris Tweed: A Growing Highland Industry . . . . . *H. A. Moisley* 353

Book Reviews

P. Pinchemel, A. Vakili, and J. Gozzi: Niveaux Optima des Villes: Essai de définition d'après l'analyse des structures urbaines du Nord et du Pas-de-Calais . . . . . *Jean Gottmann* 371

Michel Chevalier and Pierre Charpentier: Champagnole . *Jean Gottmann* 371

Michel Laferrere: Lyon: Ville Industrielle . . . . . *Jean Gottmann* 371

Chicago Area Transportation Study, Final Report . . . *Harold M. Mayer* 373

Philip L. Wagner: The Human Use of the Earth . . . *Rhoads Murphey* 374

The editors and the University assume no responsibility for statements and opinions expressed by contributors

ECONOMIC GEOGRAPHY

Editorial and Business Offices: 950 Main Street, Worcester, Mass.

Published Quarterly at

Commonwealth Press, 44 Portland Street, Worcester, Mass.

PRICE, $2.00 THE CURRENT NUMBER SEVEN DOLLARS A YEAR (except for charter subscribers)

Second Class Postage Paid at Worcester, Mass.

Copyright 1961 by Clark University, Worcester, Massachusetts

THE FUTURE

Among forthcoming articles are:

An Approach to Demographical System Analysis . . . . . *Reino Ajo*

Agricultural Colonization in the Dominican Republic . . . . . *J. P. Augelli*

A Comparative Analysis of United States Ports and Their Traffic Characteristics *R. E. Carter*

The Sheep/Swine Ratio as a Guide to a Century's Change in the Livestock Geography of Nova Scotia . . . . . *Andrew H. Clark*

Measurement in Human Geography . . . . *J. T. Coppock and J. H. Johnson*

The Functional Structure and Central Business District of Lourenco Marques, Mocambique . . . . . *Harm J. de Blij*

Resource Utilization and the Conservation Concept . . . . . *C. Duncan*

Japanese Inter-prefectural Rice Movements . . . . . *John D. Eyre*

The Relationship Between Cash-Grain Farming and Landforms . *John J. Hidore*

Regional Protection: A Factor in Economic Geography . . . . *Gerald Manners*

Geography of the World Petroleum Price Structure . . . . *Alexander Melamid*

Floodplain Farming on the Maitland Flats, Hunter Valley, N.S.W. *K. W. Robinson and T. M. Burley*

Changing Geography of the Lancashire Cotton Industry . . . *H. B. Rodgers*

Economic Geography in the U.S.S.R. . . . . *Julian G. Saushkin*

Metropolitan Development in the United Kingdom . . . . . *Leo F. Schnore*

Calgary: A Study in Urban Pattern . . . . . *P. J. Smith*

Commercial Passenger Linkages and the Metropolitan Nodality of Montevideo *David E. Snyder*

Locational Emphasis of the Australian Work Force . . . . . *R. J. Solomon*

The Urban Hierarchy: An Air Passenger Definition . . . . . *E. J. Taaffe*

The Decline of Land Settlement in Manitoba and Saskatchewan *Burke G. Vanderhill*

An Economic-Historical View of Natural Resource Use and Conservation *Leonard Zobler*

ECONOMIC GEOGRAPHY

VOL. 37 OCTOBER, 1961 NO. 4

MERRIMACK VALLEY MANUFACTURING: PAST AND PRESENT

William H. Wallace

Dr. Wallace is Assistant Professor of Geography at the University of New Hampshire. *Research for this paper was supported by a grant from the Central University Research Fund of the University of New Hampshire.*

THE manufacturing towns of the Merrimack Valley make up one of America's oldest industrial areas. In the first half of the nineteenth century, the rapid rise of this region to industrial prominence, based on water-powered textile manufactures, attracted world-wide attention. Later, large numbers of shoe factories began to enter the Merrimack region, and today these remain as the leading type of manufacturing. Since the early nineteen twenties, the formerly-prosperous textile industry, the foundation of the valley's economy, has suffered a disastrous decline, causing chronic unemployment in many of the formerly highly specialized textile mill towns, and some of these have become "depressed areas." It is the purpose of this study to investigate recent changes in Merrimack Valley manufacturing and to assess the impact of these changes on the region.

Manufacturing trends will be studied largely in terms of employment. Merrimack Valley manufactures are primarily labor-oriented: they use large amounts of labor, and labor is a large part of the total cost of production.

Inspection of a map showing the distribution of manufacturing employment in eastern New England (Fig. 1) reveals the Merrimack Valley towns as a distinct unit, separated from other major manufacturing concentrations by non-industrial zones of appreciable width and unified by a distinctive set of site and industrial structure characteristics. As defined in this study, the Merrimack manufacturing region consists of the New Hampshire counties of Belknap, Merrimack, and Hillsborough, together with the Massachusetts employment office areas of Lowell, Lawrence, Haverhill, and Newburyport[1] (Fig. 2).

THE BEGINNINGS OF MERRIMACK VALLEY MANUFACTURING

In the valley of the Merrimack were established some of America's first true

[1] The "employment office areas" used are those set up by the Massachusetts Division of Employment Security. These areas consist of a major industrial city plus surrounding suburban and satellite towns which may be considered tributary to it. The employment office area in Massachusetts is thus a small manufacturing region. These employment office areas, together with the three New Hampshire counties, are the statistical areas that most closely approximate the Merrimack Valley manufacturing region.

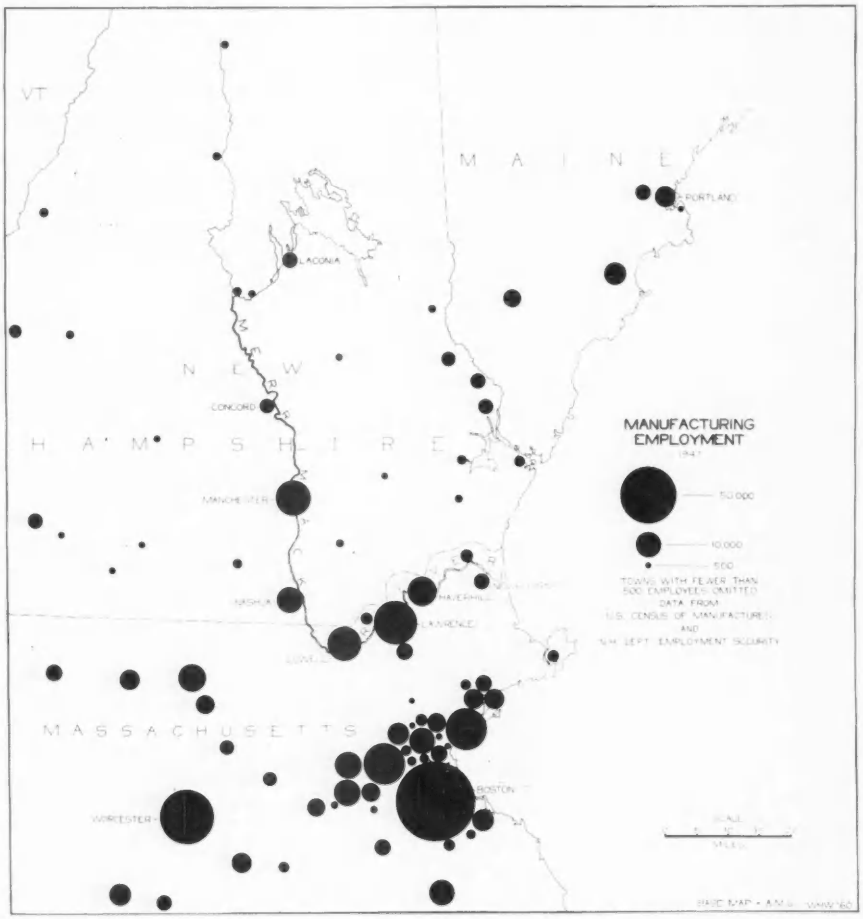


FIG. 1. Manufacturing employment in eastern New England, 1947.

industrial towns. Outstanding among these are Lowell (1823),[2] Manchester (1838), and Lawrence (1848), all of which were based on water power developed at major falls in the river, and were, from their beginnings, "mill towns." These places were rural towns before industrialization, and are among the earliest products of the industrial revolution in the United States (Fig. 3). The success of manufacturing in these early centers led to the establishment of other, smaller mill towns at sites less advantageous for water power development, and by the end of the Civil War there were approximately 55,000 people working in Merrimack Valley factories. Although small woolen mills were established at a number of falls in the Merrimack Valley during the early years of the 19th Century, the first large mills

[2] Figures in parentheses indicate the dates of the first major water power developments on which large scale factory industry was based. At Lowell (then part of Chelmsford) and Manchester (then Derryfield), small mills of various types were in existence prior to these dates.

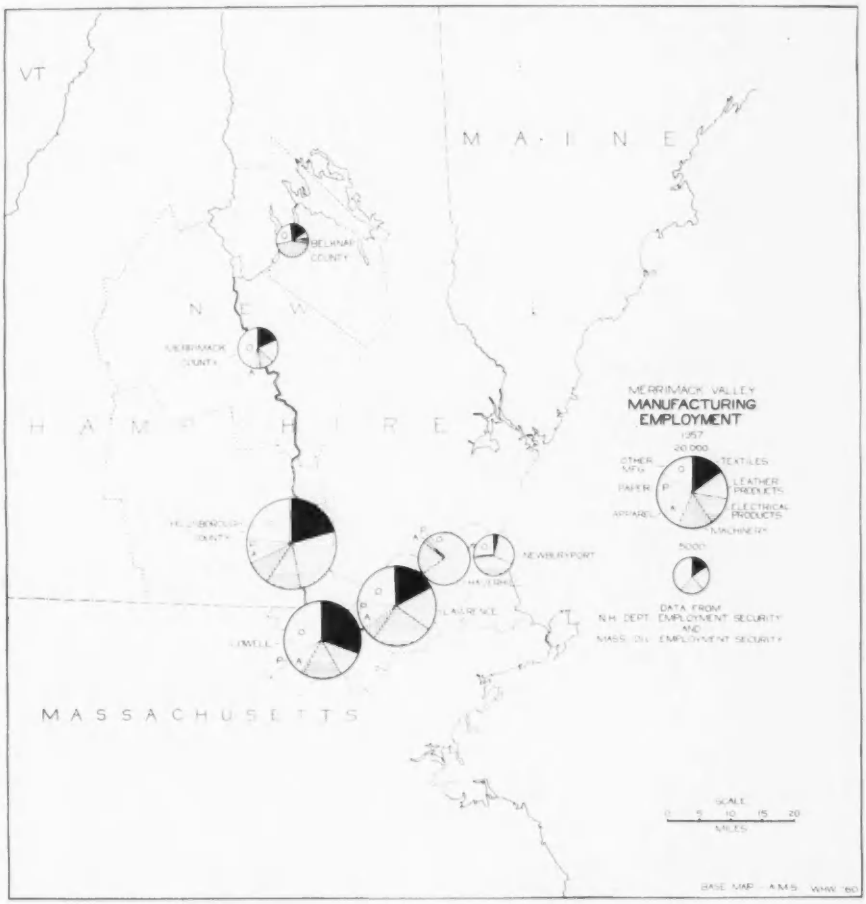


FIG. 2. Merrimack Valley employment structure, 1957. Dependence upon two problem industries —textiles and shoes—is still great, though electrical products manufacturing has been rapidly increasing in importance.

were almost all cotton producing establishments, and these provided the basis for the development of the first real mill towns. In later years, woolen, knitting, and worsted mills[3] were to dominate certain towns or groups of towns, but never did they employ as many workers as the cotton manufacturers. The early development of textile manufacturing was based almost exclusively on the use of water power,[4] an abundant local resource that was complemented by a

[3] Knitting mills were established in and around Laconia from about 1850 onwards. The first significant development of worsted mills began in the Merrimack Valley just before the Civil War when large plants were built at Lawrence (Pacific Mills), and Lowell, Mass. (Hamilton Co.), and in Manchester, N. H. (Amoskeag Manufacturing Co.). See Malcolm Keir, *Manufacturing* (New York, 1928), p. 391.

[4] Not until after the Civil War, when improvements in railroad transportation made the use of coal economical and convenient, did steam-powered mills become common. See Caroline E. Ware, *The Early New England Cotton Manufacture: A Study in Industrial Beginnings* (Boston, 1931), p. 82.

plentiful supply of intelligent labor (primarily female) drawn from the farms and villages of the region. The exploitation of these Merrimack Valley assets was made possible by the enterprise and capital of seacoast merchants and the ingenuity of Yankee mechanics.

Boot and shoe manufacture, which as a factory industry was later to become a mainstay of the Merrimack economy, was well established as a hand industry in the first decades of the 19th Century, employing the domestic system, in and around Haverhill.[5] This development was an expansion of the older shoe industry of Lynn and adjacent towns on the "North Shore" of Massachusetts Bay. The factory shoe industry that spread over the Merrimack Valley after the Civil War arrived too late to make use of the most favorable water power sites.[6] As a result, the shoe industry

[5] Hand shoe manufacture, first by individual settlers, and later by cobblers who served local needs, began with White penetration of this region. In the years following 1800, Haverhill and other towns in the lower Valley developed as centers of localized hand shoe industry, using the "domestic" system in which shoe parts were cut and distributed by central shoe shops, sewn together in homes, and then collected again by the central shop for sale in distant markets. Only after 1860 did the mechanization of shoe manufacturing convert the central shoe shop into a true machine-equipped factory. See Edward M. Hoover, "Location of the Shoe Industry in the United States," *Quarterly Journ. of Econs.*, Vol. 47, 1933, pp. 274–276.

[6] In some places, such as Manchester, textile companies controlled much of the land suitable for industrial development, particularly that based on water power, and by this means, together with pressures exerted through local government and civic organizations, were able to influence the establishment of enterprises likely to be significant competitors for the labor supply. Thus, "The shoe industry got its start in Manchester by locating on the outskirts of the city on land that Amoskeag never owned." Daniel Creamer and Charles W. Coulter, *Labor and the Shut-Down of the Amoskeag Textile Mills*, Works Projects Administration National Research Project, Report No. L-5 (Philadelphia, November, 1939), p. 116.

FIG. 3. Workers' housing built in the 1840's, Amoskeag mills, Manchester, N. H., with contemporary mills at the end of the street. Because Manchester did not exist before its mills, the developers had not only to build water works and mills, but also housing for their workers. As can be seen here, the early housing was substantial and attractive. Indeed, even today, these Amoskeag blocks present a far more pleasing scene than most of the newer working-class districts of Manchester.

has been much less related to the waters of the Merrimack Valley than to the availability of suitable labor in its towns.

In the larger textile manufacturing centers, foundries and machine shops, at first set up to repair and supply machinery for local mills, began to specialize in the manufacture not only of textile machinery, but also of many other types of machines, even locomotives.[7] Other industries that became important in the Merrimack Valley were woodworking and paper manufacture. Woodworking was, in some places, particularly the upper part of the valley, based on local forest resources, while elsewhere it was oriented to urban markets. Paper manufacturing was at first a small-scale enterprise, using water power and also requiring a supply of clear, soft water for processing; usually it was further localized by the availability of rags, which were abundant in this populous, textile-producing region, and by proximity to the printers and publishers of Boston and other New England cities. After the 1860's, the development of the techniques of wood pulp manufacture made the forests of northern New England a resource for some of the Merrimack Valley paper mills.

THE MERRIMACK VALLEY DURING ITS INDUSTRIAL HEYDAY—1909–1919

During the decade 1909–1919, Merrimack Valley factories employed approximately 150,000 people, a labor force not equaled before or since (Table I). As during most of the previous century, the industrial structure of this period was dominated by textile manufacturing. Textile mills were everywhere important, and employed approximately one-half of all the industrial workers in the valley (Fig. 4). The boot and shoe industry was by this time the second ranking industry, engaging about one-fifth of the manufacturing labor force, but it was largely confined to the lower part of the valley. A distinctive feature of the Merrimack manufacturing pattern, at this and earlier periods, was the specialization of towns or groups of towns in one or two industries. Thus, in Haverhill and the towns to the east, shoe manufactures were dominant. Lawrence and Lowell were textile mill towns, with woolens and worsteds predominant in the former, and cottons, in the latter. In southern New Hampshire, Manchester and Nashua were primarily cotton centers, but both also had important shoe industries, as did adjacent smaller towns. The dual dominance of cottons and shoes extended beyond Manchester and up the valley of the Suncook River to Pittsfield, but to the north, in the upper valley, industrial structures were more diversified. Here, textiles were also by far the largest single industry, but cotton mills were absent north of the Suncook Valley, and hosiery mills (concentrated around Laconia) and woolen factories formed the basis of textile activity. In this upper part of the valley, the combined employment of wood products, the pulp and paper industries, and machinery manufacturing (particularly textile machinery) almost equaled that of textile mills, while shoe shops played but an insignificant role.

DECLINE

The years that followed the First World War were a time of increasingly severe competition in the textile and shoe trades. This competition was brought about by the continued operation of excess capacity built up under

[7] Important centers of textile machinery manufacture developed at Lowell, Laconia, and Franklin. Locomotives were made in Lawrence, Lowell, and North Andover in the 1830's, 1840's, and 1850's, and in Manchester from 1849 until the early years of the present century.

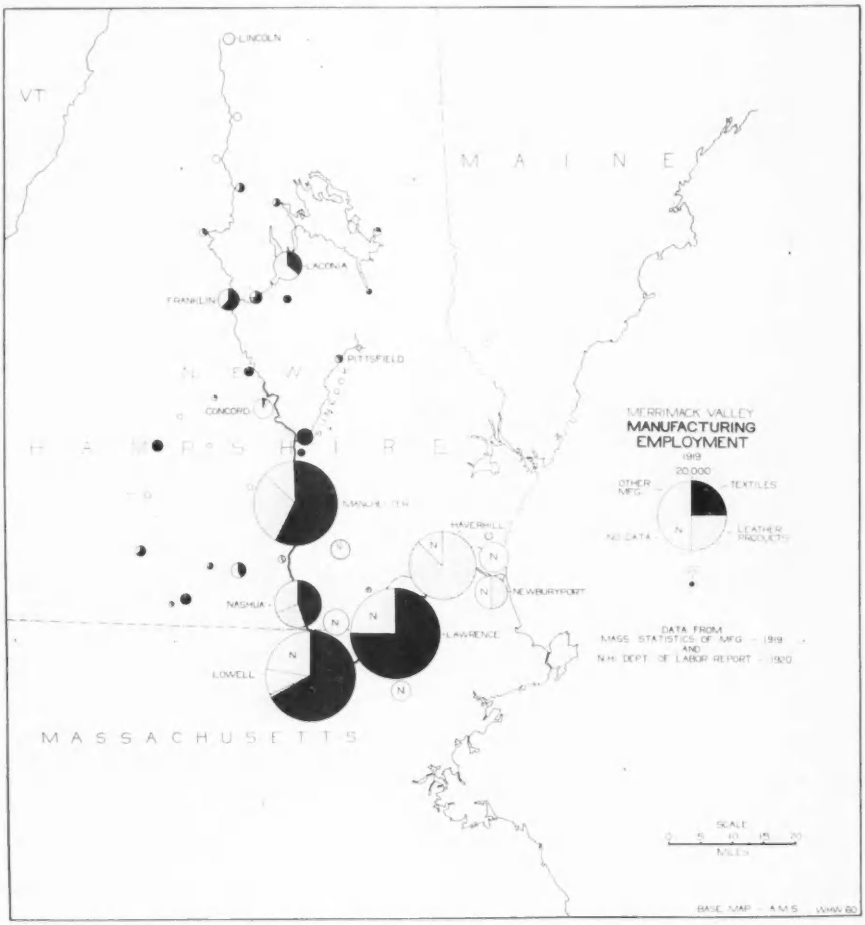


FIG. 4. Manufacturing employment in the Merrimack Valley, 1919.

the impetus of war-time demands. In these industries, labor costs are a critical part of the total costs of production, and the relatively highly-paid, militant labor forces of the Merrimack Valley, combined with the greater age and generally less efficient nature of its plants, placed this area at a disadvantage relative to newer competitors in other parts of the country. Throughout this period a continuous exodus from older industrial centers to new locations with untapped labor pools took place.

This situation affected most acutely the oldest and largest Merrimack Valley industry—the cotton mills. The competition of lower cost producers in the Piedmont South soon became intolerable, and, by the mid-twenties, the decline of the Merrimack Valley cotton textile industry was well under way. It was in 1926 that the "Cotton Growing States" first surpassed New England in numbers of active cotton spindles, and from that time onwards the South has drawn farther and farther ahead.

As a matter of fact, southern cotton manufacture had begun many years earlier; it was in the decade of the 1880's that the large-scale cotton industry was established on the Southern Piedmont. After 1900, the Piedmont cotton industry grew very rapidly, but the great expansion of markets, aided by the First World War, kept the demand for cottons abreast of production, and prices remained high, bringing general prosperity. With the 1920's came slackened demand, lower prices, and hard times for all, but particularly for the high-cost producers.

The secular decline of Merrimack Valley cotton manufacturing was matched by similar trends in the knitting mills, and this decline, combined with temporary depression in the woolen and worsted trades, together with lack of growth and movement away from traditional centers in the shoe industry, was calamitous for the region. Prosperity in other lines of manufacturing could not counterbalance the unhealthy condition of the basic industries, and, by 1929, before the national depression had begun, the Merrimack Valley was already a depressed area. Nearly every major industrial center had lost employment since 1919, and for the region as a whole, the aggregate loss during the decade exceeded 40,000 jobs; indeed, manufacturing employment was now below the levels of 1899 (Table I)!

The Great Depression of the 1930's accelerated the closing of Merrimack Valley cotton and knitting mills and paralyzed all other forms of economic activity. Employment levels sank ever lower. The closing, never to reopen, of the vast Amoskeag mills of Manchester in December, 1935, marked the nadir of the Valley's fortunes (Fig. 5). For nearly a century, these mills had been the basis of Manchester's economy, and it was about them that the city had grown. At their peak employment, in 1922, the Amoskeag mills engaged 17,500 workers, and, even in 1935, they gave employment to as many as 11,000 persons.[8] The closing of these mills dealt Manchester a blow from which it has

[8] See Creamer and Coulter, *op. cit.*, Letter of Transmittance, p. V, and pp. 68–70; and also *Report on the New England Textile Industry* (Cambridge: Conference of New England Governors, Committee on the New England Textile Industry, 1953), p. 304.

TABLE I

MANUFACTURING EMPLOYMENT 1899–1947
MERRIMACK VALLEY (PRINCIPAL CITIES), NEW ENGLAND, AND THE UNITED STATES

Area	*1899*	*1909*	*1919*	*1929*	*1939*	*1947*
Newburyport	2,801	3,213	3,960	3,186	2,021	3,306
Haverhill	9,761	11,689	15,783	8,284	7,522	9,935
Lawrence	20,899	30,542	30,319	23,105	24,498	27,159
Lowell	29,254	32,575	30,111	17,097	13,828	16,053
Nashua	5,777	7,265	8,264	6,877	8,232	8,670
Manchester	17,862	24,735	25,512	19,168	11,898	16,708
Concord	2,432	2,693	2,444	2,523	1,415	1,677
Laconia	1,535	2,235	2,579	1,471	1,567	3,458
Total of above areas	90,321	114,949	118,972	81,711	70,981	86,966
Index (1919 = 100)	76	96	100	69	60	73
New England	851,903	1,101,290	1,347,531	1,098,514	947,412	1,248,325
Index (1919 = 100)	63	82	100	81	70	93
United States	4,501,919	6,261,736	8,464,916	8,369,705	7,808,205	11,917,884
Index (1919 = 100)	53	74	100	99	92	141

Statistics for the years 1899–1939 are for wage earners; statistics for the years 1947–1954 are for production workers. Data are from *U. S. Census*, 1900, 1910, 1920, 1930, and 1940; and *Census of Manufactures*, 1947 and 1954.

FIG. 5. Even today, the Amoskeag mills (Manchester, N. H.) are an impressive industrial complex. The mills line both sides of the Merrimack River, and the dam is seen in the left foreground. The older mills flank the canals along the east bank for approximately a mile. The mills on the west bank are newer and were not water-powered. This complex is now owned by Amoskeag Industries, Inc., and is occupied by many light industries, warehouses, and stores. The F. E. Everett Highway is shown under construction on the west bank of the river. ("A Monocrat Photo," by Peter E. Caikauskas.)

not yet recovered.[9] Other less spectacular, but collectively damaging factory closings, occurred in towns all over the region, so that despite a general upturn of activity in the latter years of the decade, the total manufacturing employment in 1939 was still more than 12,000 less than in 1929, and a dismal 60 per cent of the levels of the prosperous 1909–1919 period. It was evident that the disastrous losses of textile jobs were not being compensated for by expansion in other types of industry, even though continuing decentralization of shoe manufacturing brought some new jobs to New Hampshire portions of the valley.

[9] Manchester unemployment rates have consistently been greater than the average for New Hampshire and for the United States as a whole, see William J. Roy, *The Manchester Economy* (New Hampshire Division of Employment Security, Concord, N. H., May, 1953), Table 38, p. 73; and also *Employment Summary for New Hampshire, 1957* (New Hampshire Department of Employment Security, Concord, N. H., November, 1957), Table 19, p. 56.

RESPITE: PROSPERITY DURING WORLD WAR II AND THE RECONVERSION PERIOD

The upsurge of industrial activity that came with the onset of the Second World War afforded the depressed Merrimack Valley an interlude of relative

prosperity. War-time demands for clothing and shoes were so great that even marginal producers were able to operate, so long as materials and labor were available. The revival in the textile and shoe trades, together with expansion in most other types of activities, particularly metalworking, reversed the downward trend of the previous 20 years. On the basis of "pent-up" consumer demand, this prosperity continued into the post-war "reconversion" period, and, in 1947, Merrimack Valley manufacturing employment totals exceeded those of 1939 by more than 20,000 jobs and stood at the highest levels since 1919. However, it should be noted that there were still more than 35,000 *fewer* people employed than during the prosperous 1909–1919 decade, and that this record compares very unfavorably with the national trend and even the New England regional trend (Table I). And, equally important, no fundamental changes in the industrial structure had taken place.

Despite the severe losses of the previous quarter-century, textiles were, in 1947, still the largest segment of the Merrimack Valley industrial structure, providing 45 per cent of the total manufacturing employment (Table II and Fig. 6). Shoe manufacture had less than half the employment of the textile mills (20 per cent of the total), but it engaged nearly four times the labor force of the third-ranking industry, machinery making. In part, this continuing specialization in textiles and shoes was a reflection of the war-time and immediate post-war prosperity of these industries. But, unfortunately, this situation was also evidence that the textile losses of the 1920's and 1930's had not been made up by increases in other types of manufacturing. Thus the Merrimack Valley region was still dominated to a dangerous degree by two "problem" industries—textiles and shoes. Diversification had not been achieved.

THE POST-WAR DECADE, 1947–1957

For the Merrimack Valley, the post-war period has brought a resumption of trends that began 30 years earlier and were halted only temporarily by the Second World War. The exodus of the textile industry has been resumed. In the years between 1947 and 1957, the number of workers engaged in this activity decreased by approximately 38,500 or 67 per cent, a loss so great that it depressed the general employment level of the entire region.[10] As a result, the textile industry has finally fallen from first rank among the manufactures of the Merrimack Valley, a position that it had held since the inception of factory industry (Table II and Fig. 6).

The long-continued decline of cotton manufacturing has now been joined by the shutting down and closing of many woolen and worsted mills in a manner ominously similar to the history of cottons during the 1920's. During the past decade the most spectacular textile mill closings have occurred in Lawrence, where the liquidation of giant woolen and worsted plants has reduced textile employment by nearly 24,000 (Fig. 7). In Nashua, the closing of the Nashua and Jackson cotton and synthetic cloth mills, operated by Textron, Inc., eliminated about 4,500 jobs.[11] The demise of

[10] It is perhaps true that some of this loss is really a decline from "abnormally high" levels of textile employment in the immediate post-war period. See William J. Roy: *Textile Employment Changes in New Hampshire 1947–52* (New Hampshire Division of Employment Security, Concord, N. H., 1953), pp. 3–5, 14. However, a comparison of textile employment in 1947 with that in 1919 certainly does not make this employment appear inflated.

[11] William J. Roy, *New Factory Employment and Jobs Lost in New Hampshire, 1947 to 1954* (New Hampshire Division of Employment Security, Concord, N. H., April, 1955), p. 27.

these large mills has attracted greatest attention, but, unfortunately, these misfortunes have been accompanied by the shutting down of smaller mills in many other Merrimack Valley towns.

The one bright spot in the dismal textile picture is the modest expansion in knitting-mill employment during the post-war period, continuing a trend which began in the latter years of the Depression decade.[12]

The causes of the long decline of the cotton industry in the Merrimack Valley are well known, and at this point it is more pertinent to inquire into the basis for the existence of the small

[12] This statement is based on examination of detailed employment statistics and interviews with employment service officials. Unfortunately, the law prohibiting publication of statistics that disclose information for individual establishments has restricted the availability of data and makes it impossible to cite figures for specific office areas or counties, or to present uniform data for the region as a whole. The only figure that can be given for the Massachusetts areas is total knitting mill employment in the portion of the Merrimack Valley lying within that state: 1947—1386 employees; 1957—1428 employees; figures were compiled from data in the files of the Massachusetts Division of Employment Security. For the New Hampshire part of the Merrimack Valley, state employment totals are relevant because nearly all of the state's knitting mills are located in Merrimack Valley towns. Employment in New Hampshire knitting mills: 1909—3129; 1914—3328; 1919—2979; 1925—2444; 1929—2077; 1939—1144; 1947—1528; 1954—1903; data are from the *United States Census*, 1900, 1910,1920, 1930, and 1940, and the *Census of Manufactures*, 1947 and 1954. Figures for the years 1909–1929 are for wage earners; figures for the years 1939–1954 are for production workers. The increase in knitting mill employment is obviously too small to counteract the large losses in other textile mills and consequently is not revealed in the regional statistics of Table II, nor in the figures for the major textile centers given in Table III. However, the favorable textile trends in Belknap County do reflect the expansion of knitting mill activity in and around Laconia, and are evident in Table III.

TABLE II

MERRIMACK VALLEY INDUSTRIAL STRUCTURE 1947–1957

Industry group	*1947 Employment*	*1957 Employment*	*Change 1947–1957*
Total employment*	186,350	177,459	− 8,891
Agriculture—forestry—fishing	135	189**	+ 54**
Construction, including mining	5,912	7,105	+ 1,193
All manufacturing	127,041	110,252	−16,789
Food products	3,971	4,143**	+ 172**
Textile mill products	57,690	19,202	−38,488
Tobacco	20**	15**	− 5**
Apparel	3,883	5,794**	+ 1,911**
Lumber and wood products	3,936	2,710**	− 1,226**
Furniture	1,184	2,090**	+ 906**
Paper	3,368	4,951**	+ 1,583**
Printing	3,346	4,067	+ 721
Chemicals	595	942**	+ 347**
Rubber	1,208	1,319**	+ 111**
Leather and products	26,490	26,926	+ 436
Stone, clay and glass products	1,202	1,345**	+ 143**
Primary metals	1,013	1,000**	− 13**
Fabricated metals	1,777**	2,561**	+ 784**
Machinery	7,295	7,723	+ 428
Electrical products	4,826	19,977	+15,151
Transportation equipment	394**	734**	+ 340**
Instruments	823**	211**	− 612**
Miscellaneous durable goods	1,392**	2,016**	+ 624**
Miscellaneous non-durable goods	932**	550**	− 382**
Other manufacturing	1,696	2,432**	+ 736**
Transportation, communication and public utilities	7,867	8,441	+ 574
Wholesale and retail trade	31,300	32,848	+ 1,548
Finance	4,155	6,148	+ 1,993
Service and other	9,867	12,368	+ 2,501

*Employment figures are from Massachusetts Division of Employment Security and New Hampshire Department of Employment Security. Statistics are for jobs covered by unemployment compensation.

**Data incomplete because figures withheld for areas where number of establishments is less than three.

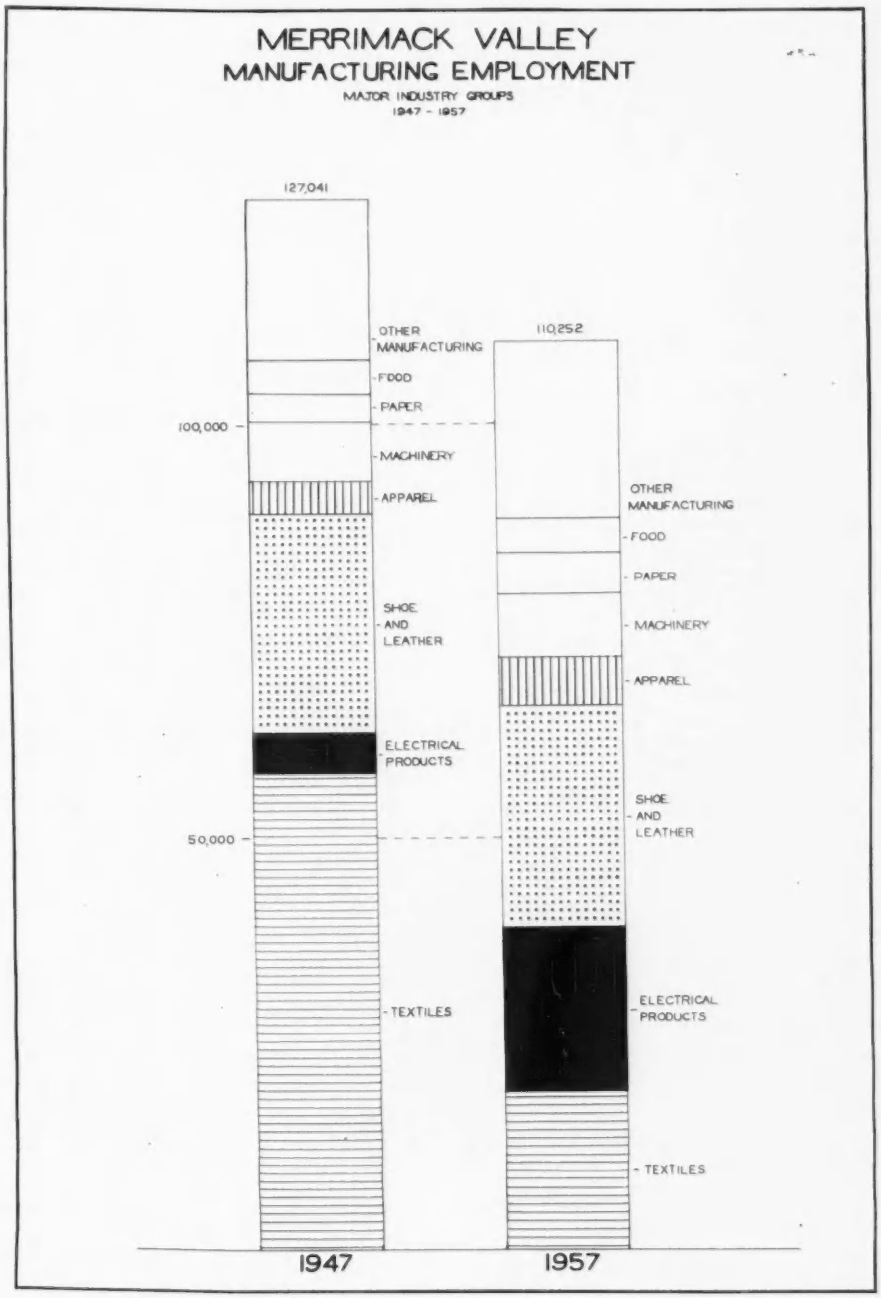


FIG. 6. The catastrophic decline in textile employment has been only partially compensated for by the rapid growth of electrical products and other manufacturing. As a result, total manufacturing employment declined by nearly 17,000 or 13 per cent during the decade 1947–1957.

TABLE III

MERRIMACK VALLEY MANUFACTURING TRENDS 1947–1957

	Employment Office Areas and Counties						
	Newburyport	*Haverhill*	*Lawrence*	*Lowell*	*Hillsborough County*	*Merrimack County*	*Belknap County*
All manufacturing—1947	7,137	11,701	38,251	24,220	34,302	6,602	4,828
All manufacturing—1957	6,780	11,426	24,855	23,623	33,054	6,106	4,408
Changes—1947–1957							
All manufacturing	− 357	−257	−13,396	− 597	−1,248	−496	−420
(Per cent loss)	(−5.1%)	(−2.3%)	(−35.0%)	(−2.5%)	(−3.6%)	(−7.6%)	(−8.7%)
Food products	− 4	+ 26	+ 96	+ 236	+ 117	−237	n.a.
Textile mill products	− 691	−497	−23,704	−5,904	−6,783	−949	+ 40
Apparel	− 57	+165	+ 769	+ 682	+ 356	+121	n.a.
Lumber and wood products	− 2	− 56	− 614	− 83	− 129	− 59	−283
Furniture	+ 51	+ 72	+ 156	+ 276	+ 208	+149	
Paper	− 18	+128	+ 909	+ 259	+ 448	n.a.	n.a.
Printing and publishing	− 41	− 22	− 15	+ 517	+ 595	−207	+ 3
Rubber	n.a.	− 21	− 155	+ 1	n.a.	n.a.	n.a.
Leather and products	− 492	−483	+ 1,968	− 157	− 904	+397	+107
Stone, clay and glass products	+ 85	+ 2	+ 6	+ 105	− 151	+130	n.a.
Primary metals	− 24	0	− 3	+ 250	+ 21	+207	n.a.
Fabricated metals	− 861	+ 16	+ 550	+ 552	+ 128		n.a.
Machinery	+ 2	+117	− 21	− 326	+1,183	+ 28	−555
Electrical products	−1,460	+321	+ 6,401	+3,182	+3,282	+312	+193

n.a.—Data not available.

Data are from Massachusetts Division of Employment Security and New Hampshire Department of Employment Security, and are for employment covered by unemployment compensation.

amount of cotton manufacturing now located in the region. The cotton production that is found in this area today consists of less-competitive types of special-purpose fabrics whose manufacture requires skilled labor, and whose price will support the relatively high wages that are characteristic in the Merrimack Valley.[13] Some of these cotton manufacturers were formerly the profitable subdivisions of larger mills that have closed, and here new firms have been set up, taking advantage of the opportunity offered by going concerns possessing accumulated managerial and labor skills.

[13] In March, 1952, average straight-time hourly earnings of cotton mill workers were as follows: U. S. average, $1.19; New England, $1.38; Middle Atlantic, $1.47; Southeast, $1.17; Southwest, $1.03. However, for the types of products most characteristic of New England mills, average earnings were $1.39 in New England and $1.27 in the Southeast. Solomon Shapiro and Charles Rubenstein, "Economic Problems and Wage Structures in Cotton Textiles," *Monthly Labor Review*, Vol. 75, No. 2, August, 1952, pp. 140–149.

The post-war decline in Merrimack Valley woolen and worsted activity is, in part, an aspect of a general depression in American wool manufacturing. Between 1947 and 1957, United States wool textile production declined by approximately 25 per cent,[14] and, during the period 1947–1956, the number of people employed fell by 82,000, or 46 per cent.[15] The generally depressed condition of the woolen trade could not but be reflected in a region that has long had a large share of this industry.

More disturbing than the recent decline of wool textile employment within the Merrimack Valley, however, is the rapid expansion of this industry in the South, particularly in the Piedmont region, and also the fact that this growth has been made up largely of newly-established branches of northern com-

[14] Data from *Federal Reserve Bulletin*, Vol. 44, No. 3, March, 1958, p. 345.

[15] Data are from *1947 Census of Manufactures*, and *Annual Survey of Manufactures: 1956*.

panies.[16] During the 1949–1956 period, the South increased its share of United States woolen spindles from 12 to 20 per cent, and its share of the nation's worsted spindles from 5 to 34 per cent.[17]

The factors causing expansion of the southern worsted industry are similar to those that earlier affected the growth of cotton textiles. Most significant is the lower level of southern labor costs,[18] which, in this labor-oriented industry, are of crucial importance. Other differentials favorable to the South include lower tax rates, lower power and fuel costs, and more favorable attitudes toward the woolen textile industry of labor, community, and government. Furthermore, as woolen and worsted plants become more numerous in the South, it is to be expected that New England's traditional advantages of proximity to raw material markets, availability of trained workers, specialized banking facilities, research facilities, and established manufacturing capacity will lose their uniqueness.[19]

If southern location is advantageous for woolen and worsted manufacture today, one might well ask why this region did not attract a significant portion of the industry in the past. That is, why, during the period 1880–1930, when the southern cotton textile industry was expanding rapidly, were not large numbers of wool textile plants also established in this region? The answer to this question is complex. Firstly, the inertia of the wool trade, with its Northern plants, and Boston-oriented raw material and product markets, was great. The skills required in woolen and worsted manufacturing were higher than in cottons. It is also true that the emotional attachment for cotton was strong in the South, and, finally, southern capitalists were preoccupied with establishing the cotton textile industry.[20]

The decades of the 1920's and 1930's, however, brought developments in the Southern Piedmont that provided a foundation for the expansion of woolen and more particularly worsted manufacture. During this period, changes in technology occurred that stimulated southern interest in the wool textile industry, among which the most important was the development of techniques for spinning wool or wool-cotton blends on cotton machinery. The stringent competitive conditions of the 1920's and the Depression of the 1930's stimulated interest in reducing production costs, and

[16] James A. Morris, *Woolen and Worsted Manufacturing in the Southern Piedmont* (Columbia, S. C., 1952), pp. 82–83.

[17] Data are from *Statistical Abstract of the United States, 1953*, p. 817, and *Statistical Abstract of the United States, 1958*, p. 804. It should be noted that the *number* of woolen spindles in the South actually *declined* during this period. The *number* of worsted spindles, however, *increased* almost threefold.

[18] In April–May, 1952, average straight-time hourly earnings of production workers in woolen and worsted mills were as follows: U. S. average, $1.45; New England, $1.50; Middle Atlantic, $1.47; Southeast, $1.19; Great Lakes, $1.23; Pacific Coast, $1.51. John F. Laciskey, "Woolen and Worsted Textile Earnings in April–May, 1952," *Monthly Labor Review*, Vol. 75, No. 4, October, 1952, pp. 403–408.

Of course, labor cost is not determined by wages alone, and at this point it would be very useful to make objective comparisons between the productivity of labor in the Merrimack Valley and in other regions. Unfortunately, data for such comparisons are extremely rare. While it is possible to compare regions in terms of units of output per man-hour, or value added to manufactures per man-hour, measures of this type do not really express the specific contribution of the labor force to production. They measure only production per hour of labor, and this is affected by a large number of separate, though interrelated factors, including the efficiency of machinery, rates of operation, types of products, efficiency of management, as well as the skill and effort of the workers. True comparisons of labor productivity are thus difficult to make, and very few employers have actually made scientific comparisons, even among their own plants. More commonly the question of labor productivity is answered empirically—if the plant is able to compete effectively, and its management regards the labor force as efficient and satisfactory, its labor is likely to be described as "highly productive," and in a field which has been as unscientific as factory location, is this not, after all, the really crucial test?

[19] Morris, *op. cit.*, pp. 153–158.

[20] *Ibid.*, p. 9.

the establishment in the early 1920's of the South's first modern worsted plant made possible comparisons of manufacturing costs between the South and other regions.[21] By the end of the Second World War, developments in the Piedmont had demonstrated that wool fabrics could be manufactured more cheaply in the South than in the traditional northern centers.[22] The stage was now set for the rapid post-war expansion of the southern wool textile industry.

Today, the woolen and worsted industry of the Merrimack Valley, like the surviving cotton mills, is composed of small units, some of which are wool processors, while others manufacture specialty items or high quality, high-style goods. Small plants are more readily able to cope with the varying demands of this trade, and this type of production makes good use of the skilled labor of the region. As a consequence of the closing of many mills in the valley, surviving or new firms have realized advantages in the form of pools of skilled labor available at depressed wage rates, and equipment and space to be had at low cost.

The striking contrast between the recent increase in knitting mill employment and the decline of other textile operations warrants comment. In what ways does the Merrimack Valley offer better conditions for this industry than for other types of textile manufacture? Among the favorable factors is the presence of a labor force experienced in knitting mill work or in other textile trades, and these are skills of particular value in the finishing operations of sweater and hosiery manufacture. Moreover, as has been noted earlier, this labor, because of depressed economic conditions in the region, will accept relatively low wages; indeed, the average hourly earnings in all New England knitting mills are very little higher than those in Southern mills, and those in seamless hosiery mills are actually lower than in the South.[23] In many cases, the attraction of individual towns has been cheap plant space, vacated by the closing of other textile mills, as, for example, in the Amoskeag "Mill Yard" at Manchester (Fig. 8).[24] Indeed, it is rather ironic that this industry is today concentrated in the Laconia area, which, before a wholesale exodus during the 1920's and early 1930's, was a major center of seamless hosiery manufacture.[25] At the present time, the typical Merrimack Valley knitting mill is a small plant, specializing in sport sweaters and hosiery, and well adapted to the frequent changes in demand for this high-style type of knitwear.

Fortunately, shoe manufacturing, the other basic Merrimack Valley industry, has had a somewhat happier post-war history than textiles. Employment has remained relatively stable (in the period 1947–1957, it increased slightly—about 400 jobs or 1.65 per cent) and, as a result, the labor force in shoe factories now exceeds that in textile mills.[26] The comparatively favorable trend of Merri-

[21] *Idem.*

[22] *Ibid.*, p. 69.

[23] In April, 1956, average straight-time hourly earnings in New England seamless hosiery mills were $1.20, compared with a national average of $1.22, an average of $1.22 in the Southeast, and $1.19 in the Border states. Fred W. Mohr, "Seamless Hosiery Mills—Earnings in April, 1956," *Monthly Labor Review*, Vol. 80, No. 1 (January, 1957), pp. 57–61, Table 1.

[24] It is interesting to note here the parallel to the recent development for similar reasons of the British hosiery industry in the depressed textile towns of Lancashire. See A. G. Pool and G. Llewellyn, *The British Hosiery Industry, A Study in Competition* (University College, Leicester, U. K., 1955), p. 9.

[25] See J. Norman Carls, "The Seamless Hosiery Industry of Laconia, New Hampshire," *Econ. Geog.*, Vol. 13, 1937, pp. 175–180.

[26] According to William J. Roy, *op. cit.*, p. 5, the leather and shoe industry did not "boom" in the immediate post World War II period because of a shortage of leather that was not remedied for several years. Thus, there has been no decline from an "abnormal" post-war peak employment level.

mack Valley shoe manufacturing parallels the recent history of this industry elsewhere in New England, for the New England shoe industry has maintained its share (about one-third) of the nation's employment and production ever since the mid-twenties, and has, in fact, improved its position since 1949.[27] Although there has been no large-scale migration from New England in this industry, there has been a continuation of a long-term tendency for older shoe centers like Haverhill and Manchester to decline in favor of, or at least to grow less rapidly than, newer locations where low wage levels, often depressed by textile mill closings, and cheap factory space, made available by the same conditions, can be had.

Since textile and shoe manufacture are both relatively high labor-cost industries, and both are usually labor-oriented,[28] it is surprising that their recent histories have been so different. However, it appears that skills are more important in shoes than in textiles and, in consequence, most branches of this industry are oriented with reference to labor quality rather than simply to low wages.[29] Furthermore, wage levels are not greatly higher in the Merrimack Valley than they are in the other major shoe producing areas of the country,[30] and there is reason to believe that the productivity of the well-trained workers of New England's older shoe districts is higher than in competing regions. It is also true that in times of expanding production, which are frequent in the highly seasonal women's shoe trade, the Merrimack Valley towns are attractive because of their pools of unemployed

[27] E. R. Livernash, "Collective Bargaining and Competitive Costs in the Shoe Industry," *Monthly Labor Review*, Vol. 80, No. 3 (March, 1957), p. 310, and see also *Monthly Review*, Federal Reserve Bank of Boston, Vol. 30, No. 11 (November, 1948); Vol. 30, No. 12 (December, 1948); Vol. 32, No. 10 (October, 1950); Vol. 35, No. 11 (November, 1953).

[28] Edgar M. Hoover, Jr., *Location Theory and the Shoe and Leather Industries* (Cambridge, Mass., 1937), p. 171.

[29] *Ibid.*, pp. 209–211.

[30] In April, 1957, average *straight-time* hourly earnings in the shoe industry were as follows: New England, $1.55; Middle Atlantic, $1.48; Great Lakes, $1.45; Midwest, $1.39; Southwest, $1.25; Border, $1.27; and Pacific, $1.58. See "Earnings in Footwear Manufacturing, April, 1957," *Monthly Labor Review*, Vol. 81, No. 3 (March, 1958), pp. 275–281. In the same month, average hourly earnings (including overtime, etc.) of shoe workers were $1.60 in Manchester, and $1.53 for New Hampshire as a whole. See *Employment Summary for New Hampshire, 1958* (New Hampshire Department of Employment Security, Concord, N. H., November, 1958), Table 14, p. 26, and Table 26, p. 41.

FIG. 7 (left). The Wood Woolen Mill, Lawrence, Mass., completed in 1905, was once the largest woolen mill in the world. Even now, after a considerable part of it has been demolished to provide parking space, its size is overwhelming. The building shown here is one-third of a mile long and six stories high, and contains 30 acres of floor space. At present, the portions of the mill that are in use serve primarily as warehouse space.

FIG. 8 (right). Most Merrimack Valley knitting mills are located in old textile plants such as this one (Amoskeag Mill No. 2, southern division, built in 1850). This mill, the Brookshire Knitting Mill of Manchester, N. H., employs about 250 people and manufactures women's sweaters.

or only partially employed skilled labor —the heritage of a long history of shoe manufacture. A peculiarity of the shoe industry that is also favorable to the Merrimack region is the *leasing system*. Shoe factories do not own the machinery that they use, but rather lease it from the shoe machinery manufacturer and pay royalties on each pair of shoes produced. This system has two effects that are significant for the Merrimack Valley. Firstly, the royalty-payment system reduces the economies of large-scale production, which is more characteristic of other regions, because all manufacturers have nearly identical machinery, and machinery costs do not decline with increases in output. Secondly, since their shops own no machinery, older shoe districts, like the Merrimack Valley, are not burdened with a large investment in obsolete equipment; their machinery is as modern as that of any other region. This is a situation which is greatly in contrast to that in the textile industry.

However, although the shoe trade has enjoyed a more favorable recent history than textiles, this industry cannot be expected to do much more than hold its own in the Merrimack region. The American shoe industry as a whole has not been experiencing a secular increase in employment, and even the most optimistic forecasts do not suggest that this activity will provide the many additional job opportunities that are needed to compensate for the huge textile losses in the Merrimack Valley.

The decline in Merrimack Valley manufacturing activity may be considered primarily as a loss of textile mills, for only two other significant industries suffered decreased employment during the post-war decade, and these declines are insignificant in comparison with the textile losses. Lumber and wood products manufacturing lost more than 1200 jobs or about 30 per cent of its total 1947 employment, while the instrument, watch, and clock industry nearly disappeared, losing about 75 per cent of its employment, although, fortunately, this decrease amounted to only about 600 jobs.

Among the industries that have expanded in the Merrimack Valley during the post-war period, the manufacture of electrical equipment is by far the most outstanding. In the 1947–1957 decade, this industry increased its employment by more than 15,000, or more than threefold. This rate of growth far exceeds the national rate of expansion in this industry (53.8 per cent) and may herald a major migration into the Merrimack region. Fortunately, expansion in the electrical products field was greatest in the areas hardest hit by textile mill closings—Lawrence and Lowell in Massachusetts, and Hillsborough County, including Nashua and Manchester, in New Hampshire (Fig. 9). As a result of its rapid growth, the electrical industry had, by 1957, slightly surpassed textile mills as an employer of Merrimack Valley labor.

Considering the unfavorable trends, or, at best, stagnation of the traditional Merrimack Valley industries, it is particularly important to examine the factors that have contributed to the spectacular post-war expansion of electrical equipment production. Chief among these is labor costs. Although the Merrimack region has traditionally been among the high wage areas of the textile and shoe industries, this is certainly not the case in electronics. The general level of wages in the depressed Merrimack textile towns is considerably below that prevalent in the major centers of this industry, and the wage paid electrical workers in Manchester, for example, is more than 30 per cent below

FIG. 9. The largest and most impressive new factory in the Merrimack Valley is that of Western Electric in North Andover, midway between Lawrence and Haverhill. This huge, ultra-modern plant employs 7500 people and symbolizes the rapid, recent expansion of electrical products manufacturing in this region. (Photo from Western Electric Company.)

the national average.[31] Thus the Merrimack Valley towns offer the electrical manufacturer a large pool of initially unskilled but tractable labor at low wages, and in a location that is relatively close to major markets. Despite its lack of experience, Merrimack Valley labor has often achieved high productivity. This is partly because the textile mills and shoe shops with their unhappy recent histories are likely to be avoided by the younger workers, and, consequently, the electronics plants have been able to attract an excellent labor supply. For some of the electrical manufacturers, proximity to the research activity of the Boston area has also been an asset.[32] In addition, some of the new concerns have been able to make use of cheap space in vacated textile mills.

Unfortunately, in no other industry does post-war growth compare, even remotely, with that in electrical products. Apparel manufacturing, which expanded by only 1900 jobs (49 per cent), is the nearest competitor. The garment industry seeks low wages, and it has grown particularly in depressed textile towns. Here it finds large female labor forces available at depressed

[31] In 1957, for example, average hourly earnings in the electrical products industry were: U. S. average, $2.07; New Hampshire average, $1.61; Manchester, $1.42. Data are from *Monthly Labor Review*, Vol. 81, No. 6 (June, 1958), Table C-1, and from *Employment Summary for New Hampshire, 1958* (New Hampshire Department of Employment Security, Concord, N. H., November, 1958), Tables 14 and 26.

[32] See "Outlook Bright for Electronics Industry," *New England Business Review*, Vol. 38, No. 4 (April, 1956), pp. 1–4.

rates,[33] and has often been able to use low-cost space in empty textile plants.

Merrimack Valley paper manufacturing participated in the expansion that has characterized this industry elsewhere in the country during the postwar period and added nearly 1600 employees, a gain of 47 per cent. Three other industries—furniture manufacture, printing, and metal fabricating—enjoyed growths ranging between 700 and 900 jobs, while machinery manufacture experienced a small gain amounting to approximately 400 jobs.

The result of the diverse trends of individual industries in the Merrimack Valley has been a net decline of nearly 17,000 manufacturing jobs, or 13 per cent, during the 1947–1957 decade (Table II). This history is particularly distressing when it is compared to a national growth in manufacturing employment amounting to approximately 20 per cent over the same period.

As we have seen, the Merrimack trend is really made up of three unlike components: a disastrous decline in textiles, stability or stagnation in the shoe industry, and rapid growth in electronics (Fig. 6). Consequently, by 1957 the traditional dominance of the Valley industrial structure by textiles and shoes had been modified; leather and shoe manufacture now occupied nearly one-fourth (24 per cent) of the manufacturing labor force, while textile activity had declined to a level such that electronics plants engaged a slightly larger share of factory workers (18 per cent vs. 17.5 per cent) (Fig. 2). The fourth-ranking machinery industry employed only 7 per cent of all manufacturing workers, and among the remaining industries only the apparel trade occupied more than 5 per cent of the industrial labor force. Thus, despite the fact that more than three decades of textile losses has lessened the degree of concentration in this industry, the Merrimack Valley industrial structure is still far from diversified. Dependence upon two problem industries—textiles and shoes—is still great, and the increasing reliance on electronics may, in time, also prove troublesome, particularly because a considerable part of the recent expansion has been based on military production.

While it is true that, taken as a whole, the Merrimack Valley has been losing industrial employment, this decline has by no means been uniform throughout the region, but has varied among the towns according to their industrial structures (Table III). Almost everywhere, the major losses were in textiles, and those areas most dependent upon this industry have had the least favorable records. Textile-dominated Lawrence lost 35 per cent of its manufacturing employment during the 1947–1957 decade; indeed, the textile losses in this one area were almost equal to the net gains in all other industries in the entire valley. Large textile losses also occurred in Lowell and in the Hillsborough County cities of Nashua and Manchester, and were the major factor in the decline in manufacturing employment in Merrimack County. Most of the older centers of shoe manufacture—Newburyport, Haverhill, Lowell, and the large cities in Hillsborough County—lost leather employment in favor of areas less concentrated in shoe production. In nearly every area, the major employment increases were in electronics, with particularly large gains occurring in former textile towns rela-

[33] In 1957, for example, average hourly earnings in the apparel industry were: U. S. average, $1.49; New Hampshire average, $1.30; Manchester, $1.38. Data are from *Monthly Labor Review*, Vol. 81, No. 6 (June, 1958), Table C-1, and from *Employment Summary for New Hampshire, 1958* (New Hampshire Department of Employment Security, Concord, N. H., November, 1958), Tables 14 and 26.

tively near Boston—Lawrence, Lowell, Nashua, and Manchester.

These trends in individual industries limited the losses of Haverhill, Lowell, Hillsborough County, and Newburyport to small percentages. The upper part of the valley, Merrimack and Belknap Counties, had a less favorable record, largely a consequence of textile losses in the former and declines in machinery and wood products manufacture in the latter county. As has already been noted, Lawrence with its huge empty woolen mills is in a class by itself.

ATTEMPTS TO COMBAT INDUSTRIAL LOSSES

The towns of the Merrimack Valley have not stood by idly while their industrial bases disintegrated. A large number of state and local organizations have participated in the effort to attract new industries. Most distinctive are the *community development corporations*. The earliest and largest of these were set up by local financial interests in cities like Laconia and Manchester where large plants, often the major employers of the community, had closed. These corporations acquired the defunct factory properties and undertook to fill them with new companies. Factory space was leased or sold at low cost, and the development organizations often helped incoming firms to obtain necessary financial backing. Some of the mill space, because of age, condition, or type of construction, was an asset of questionable value. However, where the mill buildings were relatively modern or readily improved, and could be had at very low cost, they did prove to be an attraction to light manufacturing or to warehouses and service industries (Fig. 10). As conditions improved and the more desirable empty mill space was filled, some of the development corporations acquired additional empty factories or constructed new plants in order to attract incoming industry. These properties were leased or sold to manufacturers. In only one case did a development corporation actually establish manufacturing concerns. The Amoskeag Industries in Manchester set up three small textile operations in 1938–1939, but these were later sold.[34]

A larger number of industrial development organizations, particularly those in smaller towns, own no property, but function primarily as promotional agencies. They also assist new firms in solving their financial problems, and in securing sites and buildings.

With the increasing intensity of competition for new industry, it has become more and more necessary for communities to have suitable factory space available in order to attract manufacturers. A new device that has proved useful in the struggle to bring in industry is the "industrial park," a planned industrial area in which access roads, utilities, and, in some cases, buildings that may be purchased or leased, are provided. Some industrial parks have constructed buildings only to the order of incoming industries, while others have engaged in speculative building, putting up general purpose plants with the aim of thereby attracting new companies. In New Hampshire, where capital has been scarce, the solitary industrial park in the Merrimack Valley, the Hooksett Industrial Park near Manchester, has been financed by the New Hampshire Industrial Park Authority, a state corporation. In Massachusetts, private capital, raised by community subscription or by commercial developers, has financed new industrial parks near Lowell and Amesbury and planned de-

[34] Creamer and Coulter, *op. cit.*, p. 135; and John F. Dalton, *The Community Development Corporations in New Hampshire: Their History, Accomplishment and Potential* (Graduate School of Banking, New Brunswick, N. J., 1954), p. 120.

FIG. 10. Merrimack Valley textile mills are now used for a variety of purposes. Proximity to a municipal parking lot (foreground) in the heart of Lowell has made this mill space especially attractive to retail trade and service establishments.

velopments at the other major cities.

What is the record? How successful have these attempts to attract new industry been? There are two answers to this question. There is the record of new industries attracted by, or with the help of the various development agencies. Here considerable success has been achieved in a highly competitive field. In the New Hampshire portion of the Merrimack Valley, the total employment in factories attracted by or with the help of community development corporations amounted, by 1954, to a little more than one-third of the entire industrial labor force.[35]

But in contrast to this is the discouraging record of total manufacturing employment, which we have already examined. Unlike most other parts of the country, Merrimack Valley industrial development has as its primary aim compensation for losses in older industries. Particularly because of the catastrophic decline of textiles, an extraordinary rate of new industrial development is necessary merely to maintain existing employment levels. This expansion has not taken place; indeed, within a short period, it is difficult to see how it could have taken place.

[35] Dalton, *op. cit.*, Table 9, p. 30.

IMPACT OF A CHANGING MANUFACTURING ECONOMY AND THE FUTURE OF THE REGION

For a region whose development has been based almost entirely on manufacturing, major changes in industrial structure are of profound significance to all aspects of life. It is, therefore, important to examine the impact of the post-war manufacturing trends on the Merrimack Valley. Some of the more important consequences of the industrial changes that have taken place in the Merrimack Valley lie in the differences between the old industries and the new factories that have, to some extent, replaced them. It is, therefore, relevant to inquire into the character of the new industries, and to attempt some comparison with their older neighbors.

A study of seven depressed New England textile towns, four among which were Lawrence, Lowell, Nashua, and Manchester, found that "the (incoming) firm is often not of the best type. Frequently small and with little capital resources, it seeks low wages, tax concessions, free rental or purchase of floor space at very nominal rates."[36] Though it is not possible to express the prevalence of this characteristic quantitatively, and although this generalization does not apply to many of the new manufacturers, it is probable that it does describe a sizable number of the smaller concerns. In mill towns where textiles were among the high-wage industries, it is almost always true that incoming apparel shops pay wages considerably lower than textile mills, and, at least initially, that other industries which generally pay relatively high

[36] *Report on the New England Textile Industry*, p. 308. That this was the experience in Manchester during the 1930's is also reported by Creamer and Coulter, *op. cit.*, pp. 117–134.

wages, such as electrical equipment manufacturers, also offer lower wages than either textiles or shoes (Table IV). Furthermore, even incoming textile manufacturers generally pay lower wages than their defunct predecessors.[37] The resistance of some of the displaced textile workers to low-paid employment in new industries is evidenced by the fact that unemployment often exists among textile workers while there are in the same town unfilled jobs in the new, lower-wage apparel industry.

An additional factor contributing to the depression of wage scales in the new industries is the fact that in some cases they depend even more heavily upon female labor than did their predecessors.[38] Large numbers of women factory workers, are, of course, not a new feature in the Merrimack Valley. The early cotton and worsted mills were staffed primarily by girls and women, and labor forces with large female components have continued to be characteristic of the textile industry down to the present time, and have also been, to a lesser degree, a feature of shoe manufacture. Another important consequence of the heavy dependence of Merrimack Valley industry upon female labor is a general lack of job opportunities for men, which may result in the male members of a family being unemployed while their womenfolk work. The men are often forced to commute long distances to other industrial areas in which work may be found, and some, particularly the younger and unmarried, emigrate to areas offering more favorable employment opportunities.[39]

The lower wage levels of some of the newer industries are also a consequence of the fact that they require less exacting skills than the textiles which they have

[37] See *Report on the New England Textile Industry*, p. 310.

[38] *Ibid.*, p. 311. However, William J. Roy in *Re-employment After Factory Closing* (New Hampshire Division of Employment Security, Concord, N. H., June, 1952), found that in New Hampshire there was little difference between new and old industries in proportion of female workers.

[39] William J. Roy, *The Manchester Economy* (New Hampshire Division of Employment Security, Concord, N. H., May, 1953).

TABLE IV

AVERAGE HOURLY EARNINGS, INCLUDING OVERTIME—1949, 1952, 1957
UNITED STATES, NEW HAMPSHIRE AND MANCHESTER

Industry group	*1949 Averages*			*1952 Averages*			*1957 Averages*		
	U. S.[1]	*N. H.*[2]	*Manchester*[3]	*U. S.*[4]	*N. H.*[2]	*Manchester*[5]	*U. S.*[6]	*N. H.*[7]	*Manchester*[8]
All manufacturing	1.40	1.18	1.18	1.67	1.38	1.41	2.07	1.60	1.54
Durable goods	1.47	1.12	1.13	1.76	1.33	1.32	2.20	1.63	1.51
Electrical products	1.44	1.02	1.09	1.67	1.25	1.29	2.07	1.61	1.42
Non-durable goods	1.32	1.20	1.19	1.54	1.40	1.42	1.88	1.58	1.55
Textile mill products	1.19	1.23	1.17	1.36	1.44	1.41	1.50	1.51	1.48
Apparel	1.17	.97	n.a.	1.30	1.07	n.a.	1.49	1.30	1.38
Leather and leather products	1.14	1.17	1.22	1.32	1.38	1.45	1.54	1.56	1.61

n.a.—Data not available.

[1] Data from *Monthly Labor Review*, Vol. 70, No. 6, June, 1950, Table C-1.

[2] Data from *Nonagricultural Employment, Average Weekly Earnings and Hours in New Hampshire* (New Hampshire Division of Employment Security, Concord, N. H., October, 1954), Table 7, p. 17.

[3] Data are for September, 1949, from William J. Roy, *The Manchester Economy* (New Hampshire Division of Employment Security, Concord, N. H., May, 1953), Table 34, p. 65.

[4] Data from *Monthly Labor Review*, Vol. 76, No. 6, June, 1953, Table C-1.

[5] Data are for September, 1952, from Roy, *op. cit.*

[6] Data from *Monthly Labor Review*, June, 1958, Table C-1.

[7] Data from *Employment Summary for New Hampshire, 1958* (New Hampshire Department of Employment Security, Concord, N. H., November, 1958), Table 14, p. 26.

[8] Data from *ibid.*, Table 26, p. 41.

replaced—at least initially.[40] Even when the industry is one generally requiring considerable amounts of skilled labor it is frequently found that the new plants established in depressed textile towns are engaged in operations using only unskilled or semi-skilled labor at low wages.[41] Whether this is to be an enduring characteristic remains to be seen. The experience of the textile operatives who were left unemployed by the closing of the Textron mills in Nashua is illuminating: of those displaced workers who found new employment within a year, approximately one-fifth moved downward in the labor hierarchy, at least in their first post-Textron job, and two accepted lower-paying jobs for every one who obtained an increase.[42] Unfortunately, it is generally found that textile skills cannot be transferred to other industries; it is one of the tragedies of New England textile liquidation that these valuable skills are generally permanently lost, and thus the resources of the community are further depleted.

Equally as important as wage levels is the stability of an industry in terms of firm longevity and employment levels. How do the "life-spans" of the new manufactures, electronics and apparel, that are growing in the Merrimack Valley compare with those of the traditional textile and shoe industries? Some idea of the longevity of recently-established plants in these industries may be had by an analysis of the fortunes of firms that began operations in the New Hampshire portion of the valley during the post-war decade.[43]

Over this period, the mortality rate[44] of newly-established textile mills was high, amounting to between one-third and one-half of all new firms started, and wiping out about one-third of all of the new jobs that had been created. Despite the fact that a considerable turnover of firms is considered normal in the shoe trade, new shops in this other traditional Merrimack Valley industry suffered a significantly lower failure rate, in terms of both establishments (27 per cent to 44 per cent) and employment losses (15 per cent to 21 per cent) than the textile mills. An examination of the histories of plants in the two leading "new" industries that commenced operations during this same period reveals strongly contrasting trends. The record of new apparel shops certainly leaves much to be desired—the mortality rate of firms (41 per cent to 47 per cent) and the employment losses (24 per cent to 53 per cent) of the garment industry are no better than that of the declining textile industry, and in some respects are worse. It is indeed fortunate that the other major newcomer, the electronics industry, has a far better post-war record. Indeed, during the ten-year period

[40] William J. Roy, *Re-employment After Factory Closing*, p. 17; and *Report on the New England Textile Industry*, p. 311.

[41] *Ibid.*, p. 299.

[42] Charles A. Myers and George P. Schultz, *The Dynamics of a Labor Market* (New York, 1951), p. 34. See also Roy, *Re-employment After Factory Closing*, p. 17, for an account of the fortunes of displaced woolen workers in the Laconia, N. H., area. Here 62 per cent of all who were re-employed within two years received lower starting pay in their new jobs.

[43] This discussion is based on information drawn from publications covering three periods—1947–54: William J. Roy, *New Factory Employment and Jobs Lost in New Hampshire, 1947–54* (New Hampshire Division of Employment Security, Concord, N. H., April, 1955); 1950–55: William J. Roy, *New Factory Employment and Jobs Lost in New Hampshire, 1950–55* (New Hampshire Division of Employment Security, Concord, N. H., June, 1956); and 1950–57: *New Factory Employment and Jobs Lost in New Hampshire, 1950–57* (New Hampshire Department of Employment Security, Concord, N. H., September, 1958).

[44] The "mortality rates" of all new industries established in New Hampshire during the period 1947–54 were firms, 29 per cent, and employment, 22 per cent; during the period 1950–55: firms, 27 per cent, and employment, 19 per cent; during the period 1950–57: firms, 30 per cent, and employment, 20 per cent.

studied, just one of the newly-established electrical products manufacturers in the New Hampshire portion of the Merrimack Valley ceased operations, eliminating only 4 per cent of the new employment created by this industry.

The longevity of newly established firms is important, but equally vital is the steadiness of the employment which they provide. An examination of employment levels in the traditional major industries, textiles and shoes, and those in the new and growing electrical and apparel manufacture will permit informative comparisons.

The leather and shoe industry is one in which considerable fluctuation in employment is the rule. In the Merrimack Valley, these variations generally include peak periods in late winter and late summer, reflecting the dominance of women's shoe manufacture. The textile industry of the Merrimack Valley has, in recent years, also been characterized by considerable fluctuations in employment, most conspicuously in the larger textile centers of Massachusetts where the long-time trend has been downward. In contrast, the fast-growing electrical products industry has generally enjoyed steadily rising levels of employment that display little seasonal fluctuation. The other major new industry—apparel manufacture—however, is distinguished by a lack of employment stability, and seasonal fluctuations similar to, but less definite than those characterizing shoe manufacture are also evident in some areas.

Another major question arises—has the post-war loss of manufacturing employment been compensated for by an adequate development of non-manufacturing jobs? Unfortunately, this question is not easily answered. The best available statistics indicate that total employment in all activities was somewhat less (8891 or 4.8 per cent) in 1957 than it was a decade earlier (Table II). But these data should be considered with caution; they enumerate only those jobs covered by unemployment compensation and do not include very small establishments or the self-employed. The resulting omissions are of little consequence in an analysis of manufacturing but may be considerable in agriculture, construction, trade, and services. Therefore, this evidence cannot provide a definite answer to the question. Another type of information—unemployment rates—sheds additional light on the situation. Throughout the post-war period, many of the Merrimack Valley towns, particularly the large textile centers of Lawrence, Lowell, and Manchester, have been characterized by substantial unemployment, considerably above state and national levels. The presence of large numbers of jobless workers suggests that whatever the growth in non-manufacturing employment has been, it has not, in the larger, more highly industrialized cities, been sufficient to fully engage the available labor force.

However, unemployment figures for textile and shoe towns should be read with reservation. The seasonal nature of operations in these two major industries, and also in the increasing number of apparel shops, makes a considerable amount of temporary unemployment a normal, though hardly desirable, feature in these areas. It is possible that a significant number of those unemployed are not really full-time members of the labor force. Some may go into factories on a part-time basis, with no expectation of year-round employment. Others working in unstable industries may aim primarily to work long enough to establish eligibility for unemployment compensation, rather than seek full-

time employment.[45] On the other hand, there are many who withdraw from the labor force because jobs are not available, or because they fear that they are too old to find work in new industries. Indeed, in most textile and shoe towns there is a "hard-core" of unemployed middle-aged and elderly workers who lack sufficient mobility to develop new skills for new jobs or to move to areas where opportunities are better. It is also true that a considerable fraction of the Merrimack Valley unemployed are women, few of whom are the major breadwinners of families. In this region multi-wage-earner families are traditional, and this is a factor which may act to lessen the effect of unemployment. However, these conditions are also a reflection of the prevalence of low wage levels and there is no denying that unemployment of substantial numbers of women workers is a major economic loss to the community. It should also be pointed out that the employment situation in many textile towns would be far worse were it not for the fortunate proximity of parts of this region to other urban areas, particularly Boston, that permits long-distance commuting to other labor markets.

Another vital consideration is the effect of the decline of manufacturing upon incomes and hence living standards. Unfortunately, evidence on this question is not easily obtained.[46] However, the best information available suggests that per capita incomes in the Merrimack Valley are about equal to the national average; this is low for industrial areas and is about 10 per cent less than the New England regional figure. Despite the industrial problems of the Merrimack region, the per capita income of its people appears to be rising at a rate which, although slower than the average for the New England region, is about equal to that of the nation as a whole. If this is the case, we are confronted with the surprising situation in which real income has increased despite languishing basic industries. In assessing the effect of the decline of manufacturing this evidence must be considered along with that of employment levels and unemployment rates.

In the Merrimack Valley, where growth has in the past been based very largely upon the development of manufacturing, a major industrial decline might be expected to have profound effects upon population. But it has already become apparent that the impact of the loss of manufacturing jobs has been moderated by the expansion of employment in other fields, by the prevalence of multi-wage-earner families, and by long-distance commuting to other labor markets. In addition, the people of the old mill towns are not very mobile and there has been surprisingly little emigration. Thus a number of factors, some of them counteractive, have worked to produce the population trends of the post-war era. Population has actually declined only in the larger textile and shoe cities of Massachusetts —Lowell, Lawrence, and Haverhill (Table V). Moreover, it appears that to some extent this decline, as well as slow growth in other old manufacturing centers, is part of the nationwide phenomenon of decentralization, and is accompanied by rapid suburban growth in less populous adjacent towns. The smaller and industrially less specialized cities of

[45] See *The New England Economy* (Committee on the New England Economy, Council of Economic Advisers, Washington, D. C., July, 1951), pp. 40–41.

[46] Charles L. Crangle and Paul Hendrick, *New Hampshire Personal Income, 1957* (Concord, N. H.: New Hampshire Economic Growth Survey Committee, New Hampshire State Planning and Development Commission, Concord, N. H., October, 1958), Tables 1, 2, and 3, pp. 2–4. Additional income data appear annually in the May 10 issue of *Sales Management*.

TABLE V

POST-WAR POPULATION CHANGES
MERRIMACK VALLEY AND OTHER INDUSTRIAL AREAS

Area	Population		Change 1950–1955	
	1950	1955	Numerical	Percentage
Newburyport	14,111	14,549	+ 438	+ 2.8
Amesbury	10,851	11,189	+ 338	+ 3.2
Haverhill	47,280	45,436	- 1,844	- 3.9
Lawrence	80,536	76,094	- 4,442	- 5.5
Lowell	97,249	93,876	- 3,373	- 3.6
Other Massachusetts towns	119,895	138,708	+ 18,813	+15.7
Total Massachusetts Valley	369,922	379,852	+ 9,930	+ 2.7
Nashua	34,669	35,900*	+ 1,231*	+ 3.6
Manchester	82,732	83,900*	+ 1,168*	+ 1.4
Concord	27,988	29,000*	+ 1,012*	+ 3.6
Franklin	6,552	6,700*	+ 148*	+ 2.3
Laconia	14,745	15,500*	+ 755*	+ 5.1
Other New Hampshire towns	79,955	83,741*	+ 3,786*	+ 4.7
Total New Hampshire Valley	246,641	254,741*	+ 3,100*	+ 3.3
Total Merrimack Valley	615,563	634,593*	+ 18,030*	+ 2.9
Hartford—New Britain (Hartford County), Conn.	539,661	604,100	+ 64,439	+12.0
Albany—Schenectady—Troy, N. Y., met. area	514,490	541,700	+ 27,210	+ 5.3
Allentown—Bethlehem—Easton, Pa., met. area	437,824	449,800	+ 11,976	+ 2.7
Reading, Pa., met. area	255,740	258,600	+ 2,860	+ 1.1
Scranton—Wilkes-Barre—Hazelton, Pa., met. area	649,637	629,600	- 20,037	- 3.1
Wilmington, Del.—New Jersey met. area	268,387	306,200	+ 37,813	+13.7
Youngstown, Ohio, met. area	528,498	562,800	+ 34,402	+ 6.5
Bay City—Saginaw—Flint, Mich., met. area	512,939	570,200	+ 57,261	+11.1
Rockford, Ill., met. area	152,385	168,300	+ 15,915	+10.4
Greensboro—High Point—Winston-Salem, N. C., met. area	337,192	372,700	+ 35,508	+10.5
Beaumont—Port Arthur, Tex., met. area	235,650	272,300	+ 36,650	+15.5
Pueblo, Colo., met. area	90,188	102,200	+ 12,012	+13.4
United States total	151,683,000	165,270,000	+13,587,000	+ 8.9

*Estimate.
Data for 1950 are from U. S. Census.
Massachusetts data for 1955 are from the Massachusetts *1955 State Census of Population*.
New Hampshire data for 1955 are from William J. Roy and Wesley S. Noyes, Jr., *Population in New Hampshire 1950 to 1950* (New Hampshire Division of Employment Security, Concord, N. H., July, 1956), Table 7, pp. 16–17.
1955 data for other areas are from *Sales Management*, May 10, 1955.

Newburyport and Amesbury have experienced modest population gains during the post-war period, as has the Massachusetts portion of the Valley taken as a whole. The three New Hampshire counties increased their populations at a somewhat more rapid rate, as did most of the larger towns; only Manchester has remained almost static.

Thus, the decline of manufacturing has brought population losses or stagnation only to the largest, most fully built-up industrial cities—those unable to participate in the recent suburbanization process. The region as a whole, despite its very serious industrial problems, has been growing in population, albeit at a rate (1950–1955: 2.9 per cent) that is less than one-third the national average and is considerably less than that of many other industrial areas (Table V).

The decline of manufacturing activity has left the Merrimack Valley with a number of serious economic problems. First there is the problem of wage levels and incomes. As we have already seen, this region, largely because of its industrial structure, is a low wage area,

with manufacturing wage levels far below the national average. Furthermore, it is questionable that the increasing reliance on trade and service employment that has come with manufacturing losses has helped this situation. Jobs in nonmanufacturing activities usually pay lower wages, although they may be more stable than factory employment. One of the greatest needs of this region is to "upgrade" its employment, to obtain more high-wage jobs for its people. Another consequence of the trend away from manufacturing is an increasing balance-of-payments problem.[47] Insofar as the regional economy is shifted from manufactures that were "exported" to markets outside the valley to trade and services reaching only the local area, the ability to finance "imports" from other regions will be impaired. For an area like the Merrimack Valley, in which virtually all of the food, fuel, and raw materials consumed come from outside sources, this is a serious matter. There is a real need to increase the sale of goods and services to outside areas if the region is not to be progressively impoverished.

Finally, we come to the question of the future of the Merrimack Valley. What has this region to offer manufactures and other business enterprises, and what are its prospects?

The absence of local raw materials combined with location on the periphery of the major northeastern markets suggests that Merrimack Valley manufacturing will continue to be dominated by labor-oriented, light industries. Factories remaining in this area and those attracted to it will be localized primarily by labor costs. Recent growth in Merrimack manufacturing has been based primarily on the labor cost advantages offered to certain industries by this region. As long, and only as long, as this situation continues, will established industry remain healthy and new plants be attracted. And as long as Merrimack Valley manufacturing is dominated by industries in which wage rates are the primary factor in labor costs, the major attraction of the region will be its low wage scale. This, it might be added, is an attraction that can be used to advantage in developing trade, service, and finance activities to serve regional and national markets.

For the future, then, as in the past, the major resource of this region is its people, experienced in industrial work though not skilled except in the textile and shoe trades, and willing to work for wages that are low by comparison with those of other areas in the northeast.

[47] See *The New England Economy*, Ch. XII, pp. 141–148.

SOME ASPECTS OF THE GEOGRAPHY OF INTERNATIONAL TRADE

Andreas Grotewold

Dr. Grotewold is Assistant Professor of Geography at the University of Missouri.

IN recent years many geographers have come to appreciate how greatly regional understanding can be advanced by the study of man's functional organization of space. Nations are the most commonly recognized and among the most clearly defined units of man's spatial organization; they are connected economically by international trade.

The geography of international trade, as the present writer sees it, focuses on the exchange of goods among nations and other territorial divisions for which international trade statistics are reported. The basic facts are the size of trade (in terms of value or quantity), its commodity composition, and its direction.

By this definition the geography of international trade is virtually a virgin field of inquiry. In view of the great number of studies by American geographers dealing with the functional areal organization of commercial activities *within* nations it is surprising how little effort has been directed toward studying the commercial connections *among* nations.[1]

The geography of international trade deals with the most important aspect of the world's economic organization. Other aspects—such as the international exchange of shipping and insurance services, the transfer of capital, the migration of labor, and the transmission of knowledge—may be very important in the analysis of trade patterns. The large oil exports from Venezuela, for example, are made possible only by the international transfer of capital and technical and business "know-how."

This paper presents a few basic concepts of the geography of international trade by discussing four basic questions. These are: (1) To what extent are nations economic units? (2) What do various types of international trade statistics indicate? (3) What specific factors give rise to international trade? And (4) to what extent are nations dependent on international trade? It is hoped that the answers to these questions may help geographers to visualize the role of nations as economic units, the significance of trade to such units, and a few of the statistical difficulties encountered in the study of international trade.

Nations as Economic Units

The areal units for which international trade statistics are reported may be sovereign countries, political dependencies, or customs unions comprising some combination of such areas. With the possible exception of customs unions such units are organized primarily for political purposes. Many of them are not "nations" in the sense commonly implied by that term. Students of international trade can avoid

[1] "A Selective, Annotated Bibliography of Publications Relevant to the Geographical Study of International Trade" may be obtained from the writer.

confusion by restricting the terms "nation" and "country" to political units commonly regarded as such; other areal units may be designated collectively as "trade report units" or by some other appropriate term.

In some instances governmental control of economic affairs has given a country a very high degree of functional economic unity. The best example, of course, is the Soviet Union. The principal reason for the drastic reduction of her imports following World War II was an attempt to achieve autarky. Had this attempt been completely successful, she would have become an economic "world" by herself with no external trade at all. Complete autarky, however, has never been achieved by a modern state. More often, the purpose of governmental trade controls is to protect domestic agriculture and manufacturing industries from foreign competition or to restrict the use of foreign exchange for purchases of commodities other than capital goods needed for domestic development programs. But all such policies have an autarkical tendency and thus lead toward a strengthening of the functional unity of the country or customs union adopting them.

In countries where governmental control of economic affairs is weak, most international trade is conducted by private merchants who have considerable freedom to buy and sell where they please. Completely free international trade, however, does not exist in any of the major trading countries at this time. But before World War I a very large share of the world's trade went on without significant governmental restrictions. An example of actual trade during that period introduces a further consideration pertinent to the discussion of nations as economic units.

Before World War I merchants in Hamburg imported large quantities of coal from Great Britain.[2] This seems to indicate that for coal from Britain the cost of production and transportation to Hamburg was less than for the same type of coal from the Ruhr. Thus, Hamburg was connected in at least some respects more closely with a foreign country than with other sections of its own country.

Is it possible to devise units more meaningful or suitable than nations for the study of world-wide trade? Not without crippling handicaps.[3] Suppose that Hamburg had been combined with Great Britain into a North Sea Economic Region, and the Ruhr with the Rhineland into a Rhine-Ruhr Economic Region. Thereby, Hamburg's coal imports from Britain would have been considered internal or "domestic" trade and not been taken into account, whereas Hamburg's trade with the Rhine-Ruhr Region would have been considered inter-regional or "foreign" trade. Such a solution, it seems, would be defensible only if it could be shown that Hamburg's trade with Great Britain was more essential to that city than trade with the Ruhr and Rhineland. This may have been the case during the period of the Hanseatic League when other North and Baltic Sea ports figured prominently in Hamburg's foreland, and when Hamburg's hinterland consisted mostly of the Elbe basin. But it is doubtful that this was the case after the Ruhr became an important industrial area and the

[2] J. G. Bartholomew, ed., *Atlas of the World's Commerce*, London, 1907, pp. 131 and 133. During the inter-war period this trade declined. In 1953 Hamburg imported coal from the United States. See Guido G. Weigend, "The Problem of Hinterland and Foreland as Illustrated by the Port of Hamburg," *Econ. Geog.*, Vol. 32, 1956, pp. 1–16.

[3] A view different from the one presented in this paper has been taken by Andreas Predöhl, *Aussenwirtschaft—Weltwirtschaft, Handelspolitik und Währungspolitik*, Göttingen, 1949. A brief summary in English of Predöhl's view can be found in the bibliography already cited.

city of Hamburg was forced into Germany's customs territory (1881); and it is certainly not the case now. Next, suppose that all of Europe were made into a single European Economic Region. By this arrangement Europe's overseas imports of petroleum, grain, and cotton would be taken into account; but most of its trade in coal, iron ore, and timber would be excluded from consideration. This seems arbitrary.

Each of the economic regions considered so far includes many firms trading with each other. One who studies the trade *among* such regions ignores the trade *within* them. The only way to include all trade is by considering each firm a separate unit. This has been a practical procedure for research in transportation, industrial, and urban geography as long as the number of trading enterprises considered in the study has been small. But to comprehend world-wide trade one has to find some way of reducing the number of units. Any such units must be arbitrary in some respects. To use nations has at least the advantage that each unit is under the control of the same government (supra-national authority in the case of customs unions). In an age when governmental regulations are an important factor controlling international trade this probably has greater merits than any alternative division of the world into economic units.

The proposition of the classical theory of international trade that labor and capital are internationally immobile applies even more today than when this theory was formulated. This immobility contributes further to the significance of nations as economic units. Furthermore, with the abandonment of the gold standard by many important trading countries, governmental currency and exchange rate manipulations have become factors in world-wide trade; this is an additional justification for selecting nations as economic units. Finally, statistics on international trade are much more readily available and usually more detailed than statistics on trade among any kind of regions.

INTERPRETATION OF TRADE STATISTICS

The basic data in the geography of international trade are trade statistics. These indicate the commodity composition and origin of a country's imports, and the commodity composition and destination of its exports. The correct evaluation of such statistics, of course, is assured only if due attention is given to the definitions on which they are based.[4] Most difficulties in the interpretation of trade statistics result from differences in the valuation of commodity imports and exports and from the use of different systems of recording them.

Differences in Valuation

Virtually all countries report the value of their commodity exports f.o.b. at the frontier of the exporting country. The difficulty comes with commodity imports. Only a few countries value their imports f.o.b. at the frontier of the exporting country. Most countries, following the recommendation of the United Nations and its various agencies, report their imports c.i.f. at the frontier of the importing country. The justification is that a c.i.f. valuation states the transaction value, i.e., the value which the importer has had to pay.[5]

[4] For a discussion of common problems in the accumulation and evaluation of trade statistics see R. G. D. Allen and J. Edward Ely, eds., *International Trade Statistics*, New York, 1953.

[5] See U. N. Statistical Office, *Yearbook of International Trade Statistics: 1957*, Vol. I, New York, 1958, p. 6.

The use of a c.i.f. valuation for imports together with an f.o.b. valuation for exports has a disadvantage. Whenever there is a territory or body of water between trading countries the value of exports f.o.b. must be smaller than the value of imports c.i.f. For example, of ten dollars which country A may have paid for its imports from country B only nine dollars may have been paid to B; the other dollar may have been earned by shipping and insurance companies in country C. The income of country C is an "invisible export" not included with its commodity export statistics. For the world as a whole, the value of all commodity imports c.i.f. exceeds the value of all commodity exports f.o.b. by the cost of freight and insurance services between the frontiers of trading countries.

For the reason just mentioned and for other reasons to be discussed below there is often a considerable difference in value between a country's commodity imports and exports. A country's "trade turnover," which is the total value of its exports plus imports, takes both into account and thus evaluates all foreign trade in a single figure. It is a useful measure for comparing the size of trade of different countries.

Different Systems

Another difficulty in the evaluation of trade statistics results from the use of different systems of recording trade, such as "special trade" and "general trade."

Under the special trade system a country's imports include goods brought into its customs area and goods withdrawn from bonded warehouses or free trade zones for domestic consumption or further transformation prior to reexport. Exports include all commodities wholly or partially produced in the customs area of the exporting country.

Under the general trade system imports are the combined total of all imports, including those into bonded warehouses and free zones. Exports are the combined total of all exports, including those from bonded warehouses and free trade zones. Only direct transit trade, consisting of goods moving through a country for purposes of transit only, is excluded.

The important difference between the special and general trade systems is that under the former the trade report unit includes only its customs area, whereas under the latter it includes also the bonded warehouses and free zones located within its political boundaries. Which system is better suited to the study of international trade depends on the investigator's point of view. One who considers the manufacturing, processing, packaging, and storage activities of bonded warehouses and free trade zones as "invisible exports" comparable to shipping and transit insurance services will select the special trade system as the basis for his study. The present writer, however, prefers the general trade system. The free port of Hamburg, for example, has sizable manufacturing industries—including shipbuilding, machine construction, petroleum refining, and many others—employing over fifteen thousand workers in 1953.[6] Under the special trade system only that portion of shipments from Hamburg's free port which has originated in Germany's customs territory would be included with Germany's exports. But are not the manufacturing industries in Hamburg's free port just as much a part of Germany's trade-*creating* resource base as if they were located within Germany's customs territory? Surely they are more properly classified with other industries located in Ger-

[6] Richard S. Thoman, *Free Ports and Foreign-Trade Zones*, Cambridge, Md., 1956, p. 57.

many than with the trade-*servicing* shipping and transit insurance businesses. Furthermore, the processing, packaging, and storage activities generally characteristic of bonded warehouses and free zones may be, and quite often are, performed by establishments within the customs area of a country. Under the special trade system the imports and reexports of such establishments would be counted as international trade; but the transactions of establishments providing identical services in bonded warehouses or free zones would be excluded. This seems inconsistent.

No current system of recording trade is so refined as to exclude from a country's imports materials to be used in the manufacturing of exports, or to subtract from the value of a country's exports the cost of imported materials which have been used in making them. Such a system, although very difficult to administer, would produce figures of great interest. Imports would include only commodities for domestic consumption; and exports would include only those that could be attributed to the exporting country's domestic resources.

FACTORS IN INTERNATIONAL TRADE

What are the factors that create the imports and exports of nations? And why do countries differ in the volume of their trade?

It is a fundamental geographic truth that the endowment of resources differs from place to place. It is equally true that different combinations of resources are needed to produce different commodities. At each place persons tend to specialize in the production of those commodities which, on the basis of their resource endowment, they can produce best and to exchange those commodities for others which they are least suited to produce. Hence there is trade.[7] Basically, the distinguishing criterion of international trade is that it includes only trade which crosses national boundaries.

In the study of trade the term "resources" has a very specific meaning. It comprises only those resources which have been developed and do in fact contribute toward the production of goods and services. Resources (or the "factors of production") include all parts of nature that man has put to use ("land"), all savings and investments in buildings, machines, transportation facilities, etc. ("capital"), and all aspects of man that enhance his productive capabilities ("labor").[8] The extent to which resources affect trade depends on the degree to which they are developed. Potential resources may affect trade at some time in the future if and when they have been developed; but they are impertinent to the study of current trade patterns.

Figure 1 shows the international trade of all units with an average trade turnover of 100 million U. S. dollars or more during 1957–58.[9] Note the industrial

[7] This, of course, is a very elementary statement. For a sophisticated and detailed account of the causes, functioning, and effects of trade see Bertil Ohlin, *Interregional and International Trade*, Cambridge, Mass., 1933.

[8] I can see no basic difference between "resources" and "factors of production." Cf. Erich W. Zimmermann, *World Resources and Industries*, revised ed., New York, 1951, pp. 3–40 and 80–126, and Bertil Ohlin, *op. cit.*, pp. 67–96.

[9] Average 1957–58 exports f.o.b. plus average 1957–58 imports c.i.f., "general trade," computed and in some instances estimated on the basis of data in International Monetary Fund, *International Financial Statistics*, Washington, monthly; *Yearbook of International Trade Statistics: 1957*, Vol. I, *op. cit.*; Encyclopaedia Britannica: *1958 Britannica Book of the Year;* and S. H. Steinberg, ed.: *The Statesman's Year-Book: 1959*, London, 1959. Since trade report units with an average turnover of less than 100 million U. S. dollars are omitted, the world's total trade is understated by at least 1 per cent but probably less than 2 per cent. All trade report units shown coincide with generally recognized political units except in the following instances: the United States includes Puerto Rico; Belgium and Luxembourg

(*Continued on page 315*)

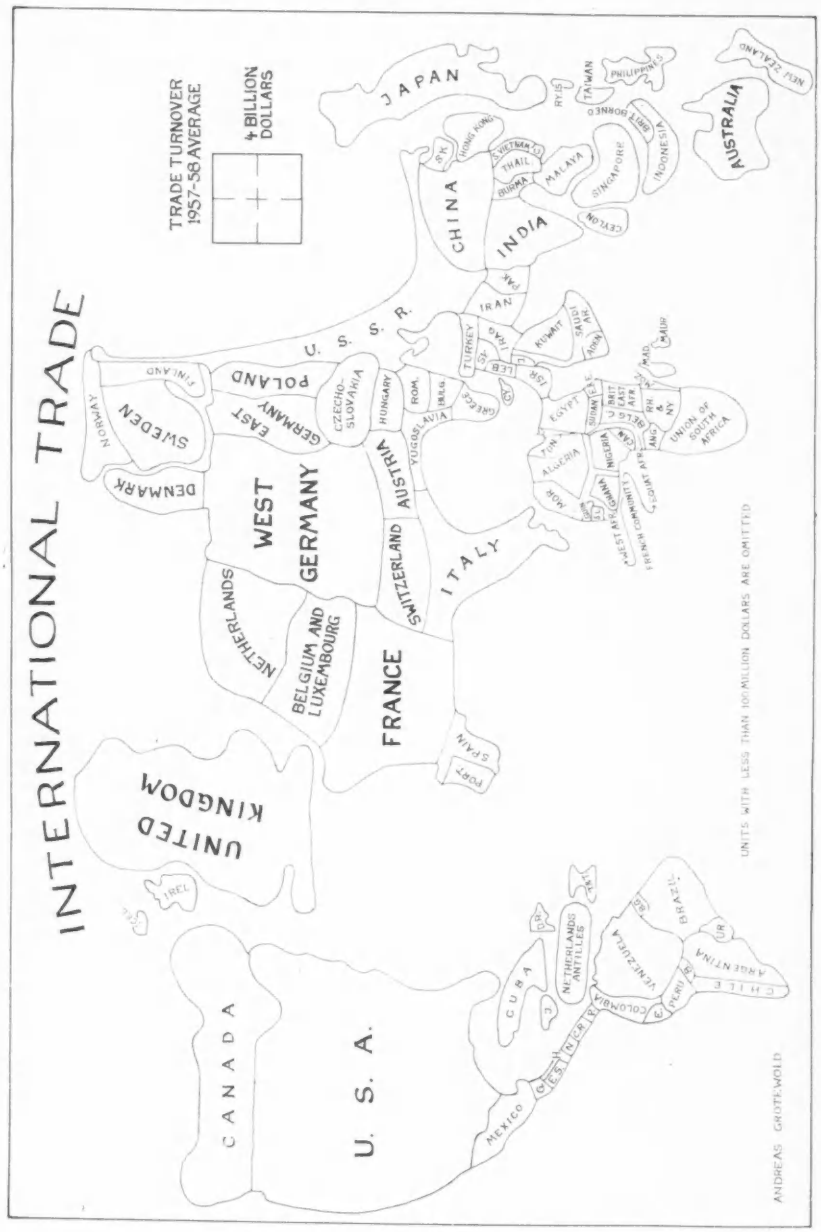

INTERNATIONAL TRADE
TRADE TURNOVER 1957-58 AVERAGE
4 BILLION DOLLARS
U. S. S. R.
JAPAN
CHINA
INDIA
AUSTRALIA
NEW ZEALAND
PHILIPPINES
INDONESIA
SINGAPORE
MALAYA
THAILAND
VIETNAM
HONG KONG
TAIWAN
RYUKYU
BORNEO
CEYLON
PAK.
IRAN
TURKEY
SYRIA
LEB.
ISR.
KUWAIT
SAUDI ARAB.
YEMEN
EGYPT
SUDAN
LIBYA
MOR.
ALGERIA
TUN.
NIGERIA
GHANA
LIBERIA
FRENCH WEST AFR.
BRIT. WEST AFR.
BELG. CONGO
ANG.
RH. & NY.
MAD.
MAUR.
UNION OF SOUTH AFRICA
POLAND
CZECHO-SLOVAKIA
HUNGARY
ROM.
BULG.
GREECE
YUGOSLAVIA
AUSTRIA
EAST GERMANY
WEST GERMANY
SWITZERLAND
ITALY
FRANCE
SPAIN
PORT.
BELGIUM AND LUXEMBOURG
NETHERLANDS
DENMARK
SWEDEN
NORWAY
FINLAND
UNITED KINGDOM
IRELAND
CANADA
U. S. A.
MEXICO
CUBA
NETHERLANDS ANTILLES
VENEZUELA
COLOMBIA
PERU
CHILE
BRAZIL
ARGENTINA
UR
UNITS WITH LESS THAN 100 MILLION DOLLARS ARE OMITTED
ANDREAS GROTEWOLD

FIG. 1

countries bordering the North Atlantic. Clearly these are the major trading nations. Nine units—the United States, Canada, the United Kingdom, West Germany, the Netherlands, Belgium-Luxembourg, France, Switzerland, and Italy—account for about half of the world's total. Additional tabulations show that about half of their combined imports and exports, or roughly one-fourth of the world's total, are traded among themselves.[10] The large foreign trade of these units stands in striking contrast to the small trade of most units in Latin America, Africa, and Asia.

The conspicuous difference among countries in the size of their foreign trade can be attributed to (1) differences in their need for imports, and (2) differences in their ability to obtain imports. The latter, of course, depends largely on the ability to export. In the normal course of events the ultimate purpose of trade is to obtain imports, and exports may be regarded as a means to this end.[11]

are considered one unit; West Germany and West Berlin are considered one unit; France and Algeria are considered separate units; Egypt and Syria, the two members of the United Arab Republic, are considered separate units; the states of the French Community in West Africa include Dahomey, the Ivory Coast, Mauritania, the Republic of Niger, Senegal, the Sudanese Republic (French Sudan), and the Voltaic Republic (Upper Volta); the states of the French Community in Equatorial Africa include the Central African Republic (Ubangi-Shari), Chad, the Republic of the Congo (Middle Congo), and Gaboon; the Belgian Congo and Ruanda-Urundi are considered one unit; British East Africa includes Uganda, Kenya, and Tanganyika; the Union of South Africa, South West Africa, and Basutoland, Bechuanaland, and Swaziland are considered one unit; China includes North Korea and North Vietnam; British Borneo includes North Borneo, Brunei, and Sarawak. Whenever political units are combined into one trade report unit, trade among them is excluded.

[10] 1957–58 averages computed from data in U. N. Statistical Office, *Direction of International Trade*, Statistical Papers, Ser. T, Vol. X, No. 8, New York, 1959.

[11] An exception are "give-away" exports under some United States foreign aid programs; such exports, it seems, consist primarily of agricultural and military surplus commodities.

Usually no trade exists unless there is both a need for imports and an ability to pay for them.[12] It is only for convenience of exposition that the two factors will be discussed separately.

Need for Imports

A country may need imports for domestic consumption or for re-export.

A country's need for imports for domestic consumption tends to be great if it has a large population and a narrow, specialized resource base; conversely, the need tends to be small if it has a small population and a diversified resource base.

A large population and a narrow base of natural resources (but not so much of human and capital resources) accounts partially for the large foreign trade of countries in northwestern Europe. Their natural resources are not nearly so diversified as those of the United States. Partially as a result of this fact, the per capita foreign trade of West Germany is two-thirds greater than that of the United States, the United Kingdom's twice, and the Netherlands' well over three times as great.

A country's need for imports to be re-exported depends on the nature of its export industries and on its entrepôt trade.

Export industries may require from other countries raw materials, semi-manufactured goods, or components. For example, the United Kingdom, the Netherlands, Belgium-Luxembourg, France, West Germany, Italy, Japan, and Hong Kong are major exporters of cotton textiles; but virtually all their cotton is imported. It seems safe to

[12] An exception is the greatly publicized import in 1957 and 1958 by the Soviet Union of Egyptian cotton which the Soviet Union did not need. Most likely there are rather narrow limits to the expansion of such trade. See Joseph S. Berliner, *Soviet Economic Aid—The New Aid and Trade Policy in Underdeveloped Countries*, New York, 1958.

assume that some portion of the imports of all countries whose exports consist largely of manufactured goods can be attributed to the needs of their export industries.

Entrepôt trade consists of the importation of goods and their re-exportation without intermediate transformation. Great entrepôts, such as Singapore and Hong Kong, are collection and distribution centers at strategic points along major shipping routes. Although political frictions and the growth of economic nationalism within their hinterlands have weakened their entrepôt functions and encouraged the growth of local manufacturing, entrepôt trade still accounts for sizable portions of their total trade turnover.

Capacity to Obtain Imports

A need for imports, of course, does not generate any trade unless the imports are actually obtained. A country's ability to obtain imports depends on its ability to finance such imports, and sometimes on political circumstances.

Commodity imports may be financed by several means.[13]

(1) Most countries finance by far the largest share of their commodity imports by income earned from commodity exports.

The small trade of most units in Latin America, Africa, and Asia is due primarily to the fact that their income from commodity exports is too small to finance the commodity imports which they need, and that alternative ways of financing imports are limited. As is well known, most people in these areas live on a near-subsistence level and consequently have very small purchasing power. Characteristically the exports of such underdeveloped areas consist of only a few primary products, and their major markets are in the industrial countries bordering the North Atlantic.[14] There the demand for many primary products tends to be erratic and in the long run expanding only slowly.[15] These may not be all the reasons for the small trade of underdeveloped areas, but they are probably the most fundamental ones.

(2) Many countries supplement their income from commodity exports with earnings from "invisible exports" such as shipping and insurance services. Such earnings, of course, may be spent on commodity imports. Norway, for example, finances a very large portion of her imports in this manner.

(3) Income earned from services to foreign governments, military personnel, and tourists—another "invisible export"—may be spent on commodity imports also. The incomes of Switzerland, West Germany, and Japan are augmented by such earnings.

(4) Grants, reparations, loans, and investments make it possible for the receiving country to import more than it could afford otherwise. A very large share of Israel's imports and substantial portions of the imports of Canada and India, for example, are paid for by grants, loans, or investments received from foreign countries.

(5) Dividends from foreign investments, if repatriated, and interest and repayments of loans may be used to

[13] For a more complete discussion see the chapter on the balance of payments in any textbook on international economics. Balance of payments figures are reported in *International Financial Statistics*, *op. cit.*; and International Monetary Fund, *Balance of Payments Yearbook*, Washington, published in sections during the year.

[14] For details of commodity exports and the direction of trade see Andreas and Lois Grotewold, "Some Geographic Aspects of International Trade," *Econ. Geog.*, Vol. 33, 1957, pp. 257–266.

[15] For an analysis of these tendencies see Contracting Parties to the General Agreement on Tariffs and Trade, *Trends in International Trade—Report by a Panel of Experts*, Geneva, 1958; and Ragnar Nurkse, *Patterns of Trade and Development*, Wicksell Lectures 1959, Stockholm, 1959.

finance commodity imports. Such income is of some importance to the United States and countries in northwestern Europe; it may become increasingly significant as more foreign loans and investments are made by these countries.

Sometimes a country's ability to import is impaired by political circumstances. Current regulations by the United States affecting trade with the Sino-Soviet Bloc afford some examples.[16]

DEPENDENCE ON INTERNATIONAL TRADE

It is a widely recognized truth that today no country can make economic progress, or even keep up its present level of living, without being in some measure dependent on the exchange of goods with other countries. But countries differ greatly in their dependence on foreign trade. Figure 2 shows the importance of foreign trade to countries as indicated by their exports as percentages of their net national incomes.[17] Unfortunately there are many units for which reasonably comparable data are not available. The base of Figure 2 is Figure 1.

Perhaps the most striking aspect of Figure 2 is the very low percentage for the United States, reflecting our diversified resource base and the orientation of our economy toward a huge domestic market. In comparison the countries of western Europe, largely due to their less diversified natural resources, are far more dependent on foreign trade. As might be expected, the dependence on trade is greatest in countries with the most narrow resource bases—Belgium-Luxembourg, the Netherlands, and Denmark, for example.

The importance of foreign trade to the economies of underdeveloped countries seems to depend very much on the extent to which a few primary products are made available for export, often with the technical and financial assistance of countries in Anglo-America or northwestern Europe. Venezuela is a perfect example. Petroleum alone accounts for more than nine-tenths of her exports and for over two-fifths of her net national income.[18]

No single figure can measure completely the extent to which a country depends on international trade. The index used in Figure 2 has three definite shortcomings.

(1) Exports may consist partly or, in the case of entrepôt trade, entirely of commodities which have been imported. The import component of exports varies from one country to another. If a country's exports consist of products made wholly or partially from imported raw materials, only a portion of the exports is part of the exporting country's national product. Therefore, the figure designating a country's "exports as percentage of net national income" (as shown in Figure 2) may be greater than the percentage of the net national income that is exported. In the case of Singapore, in fact, the import component of exports is so great that the value of exports exceeds considerably the value of the net national income.[19]

(2) The index used in Figure 2, by omitting imports entirely from con-

[16] For further information see U. S. Department of State, *Mutual Defense Assistance Control Act of 1951, Report(s) to Congress*, Washington, semiannual.

[17] Computed from data in *International Financial Statistics*, *op. cit.*; and *International Financial News Survey*, Vol. 12, 1960, p. 237. Percentage figures are shown only with units for which 1957–58 averages could be calculated. For other units the latest available data were used.

[18] 1957–58 averages computed from data in *International Financial Statistics*, *op. cit.*

[19] *Ibid.* In recent years Singapore's exports have been over one billion U. S. dollars annually; although estimates of her net national income are not available, it is safe to assume that it was considerably smaller.

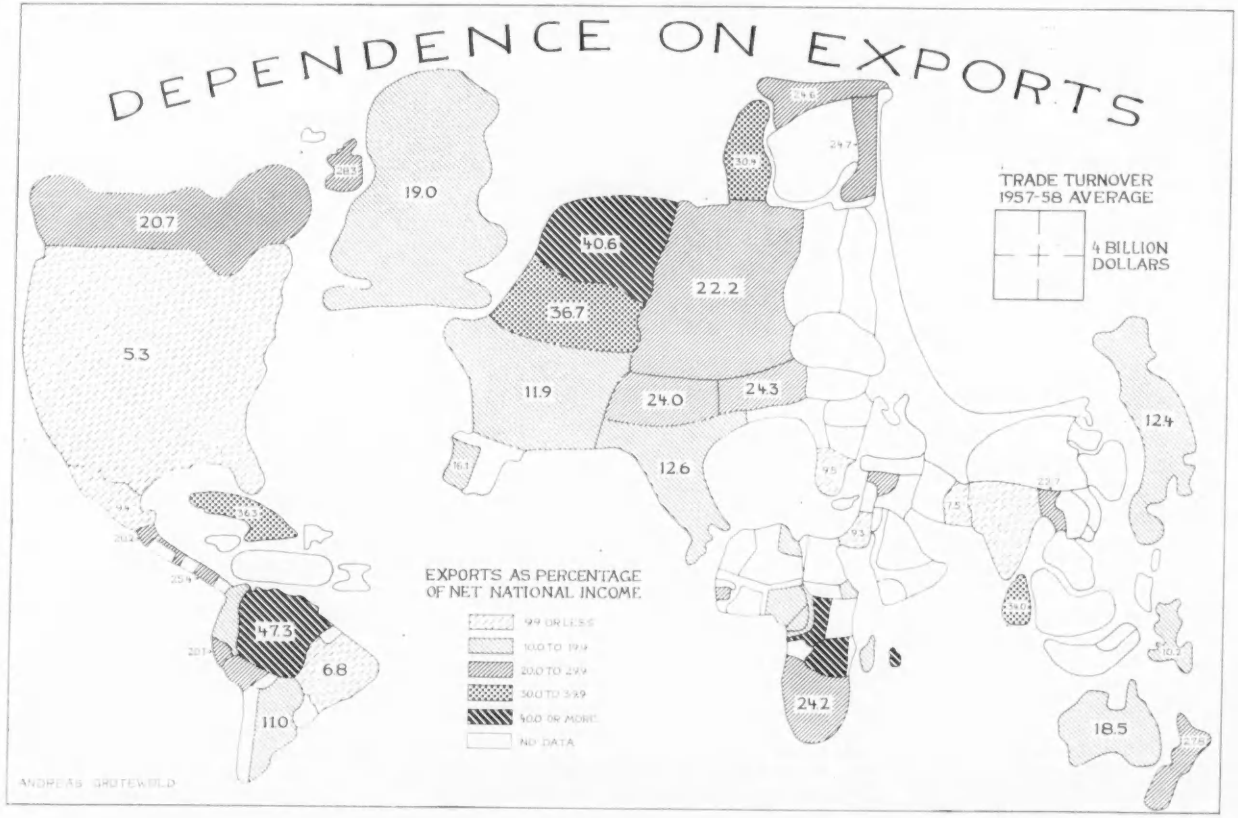

DEPENDENCE ON EXPORTS
TRADE TURNOVER
1957-58 AVERAGE
4 BILLION
DOLLARS
EXPORTS AS PERCENTAGE
OF NET NATIONAL INCOME
9.9 OR LESS
10.0 TO 19.9
20.0 TO 29.9
30.0 TO 39.9
40.0 OR MORE
NO DATA
20.7
5.3
19.0
40.6
36.7
22.2
11.9
24.0
24.3
12.6
12.4
47.3
6.8
11.0
24.2
18.5
ANDREAS GROTEWOLD

FIG. 2.

sideration, gives a lopsided view of the dependence on trade of countries which finance a considerable share of their imports by means other than commodity exports. Israel's exports, for example, are only 9.3 per cent as great as her net national income; but her imports are 28.1 per cent as great as her net national income.

(3) Any measure based on the value of exports or imports in relation to national income gives an inadequate view of the importance of foreign trade to vital sectors of a country's economy and, indirectly, to its entire economy. The United States, for example, depends on foreign sources for over 90 per cent of its net supply of chromium, and for over 80 per cent of its nickel, manganese, and aluminum.[20] Similarly, certain industries in the United States would suffer greatly if their foreign markets were reduced or cut off. The most familiar examples, of course, are in the field of agriculture. Nearly half of our cotton and wheat, and over one-fourth of our tobacco are exported.[21] The significance of foreign markets is often enhanced by the fact that they can absorb additional quantities of produce with a smaller price decline than the domestic market. This is particularly important to agriculture, where supplies are not readily controllable.

[20] 1957–58 averages computed from data in U. S. Bureau of Mines, *Minerals Yearbook: 1958; Review of Mineral Industries*, Washington, 1959, p. 12.

[21] 1957–58 average exports as percentage of 1956–57 average production (in terms of bulk) computed from data in U. S. Department of Agriculture, *Agricultural Statistics: 1958*, Washington, 1959; and *Foreign Agriculture*, Vol. 23, April, 1959, p. 12.

CONCLUSIONS

Economically the world's nations and other political divisions are connected by international trade. The geographic study of international trade, therefore, is identical with the study of functional economic geography on an international basis.

The few concepts and recommendations which emerge from this paper are only fragments which at some future time may be admitted into a well-founded methodology of the geography of international trade. The latter is most likely to develop from experience in descriptive and analytical studies. Of such experience there is very little so far.

ACKNOWLEDGMENTS

The writer is very grateful for critical comments on this paper. A first version was criticized by Jack N. Behrman and Chauncy D. Harris. The present version benefits from many helpful comments by Howard F. Hirt and Jesse H. Wheeler, Jr. The writer's studies of the geography of international trade have been supported by a University of Missouri Research Fellowship during the summer of 1960.

COFFEE TRADE, COFFEE REGIONS, AND COFFEE PORTS IN ANGOLA*

Irene S. van Dongen

Mrs. van Dongen, Associate in Research, Columbia University, has written a number of articles and a monograph, bearing on African transportation and regional geography of tropical Africa.

SOUTH AMERICA has traditionally been the main source of the world's coffee supply. After a series of ecological and marketing crises in the last 25 years, that area still accounted in 1958 for 56.4 per cent of total world exports (Table I). Since World War II, however, the African continent has made rapid progress in coffee cultivation, becoming the second most important coffee-growing area and contributing 24.3 per cent of world exports in 1958 against 8.1 per cent in the immediate prewar years.[1]

In the greatest market for coffee, North America, African *robustas* have been increasingly accepted because of their lower prices and better quality in relation to poorer grades of Brazilian and Columbian *arabicas*.[2] Among African coffee-growing countries, Angola held second rank during the years 1953 through 1957. In 1958, it was slightly surpassed by the customary third producer, Uganda; in that year its exports were 77,300 tons as compared with the 112,500 tons of the foremost African producer, Ivory Coast. For the United States, Angola has been the prime African supplier throughout the fifties, both in quality and quantity, since the greatest share of the Ivory Coast's crop went to France and Uganda's *robusta* coffee was chiefly directed to the British Commonwealth.

Coffee in Angola

The first commercial venture at coffee growing in Angola was by an expatriate Brazilian farmer in 1837 in a forested region of the north, now known as the *concelho* of *Cazengo*.[3] Thereafter, the

*This paper is one of a series on ocean terminals, transport routes, and trade movements in Middle Africa prepared by Professor W. A. Hance and the author under a Columbia University contract with the U. S. Office of Naval Research, Geography Branch, Washington, D. C. The author is greatly indebted to a number of organizations, individuals, and government officials in Angola for their cooperation and assistance in connection with the field work in 1958.

[1] V. C. Wickizer, *Coffee, Tea and Cocoa—An Economic and Political Analysis*. (Food Research Institute, Stanford University, California, 1951), p. 70, Table 2.

[2] The three commercially important species of coffee bean are *coffea arabica* (the bulk of Western Hemisphere production), *c. liberica* and *c. robusta* (which accounts for over two-thirds of African coffee exports). The characteristics of each are described in V. C. Wickizer: *op. cit.*, pp. 38–42. Until 1929, *c. robusta* was not included on the U. S. Department of Agriculture list of coffees. Used widely as a "filler" in various blends and in the manufacturing of soluble coffee, it has by now gained entrance to every United States household. Only in December, 1959, however, did this commodity receive full recognition on the New York Coffee and Sugar Exchange (*New York Times*, December 6, 1959). A useful summary of African production can be found in U. S. Department of Agriculture, *Foreign Agricultural Circular*, "Coffee—FCOF-6-57," Washington, D. C., December 4, 1957.

[3] *Concelhos* and *circumscrições* are the second in order of administrative subdivisions of the Portuguese Overseas Province of Angola, the first being *distritos* or districts. Most territorial statistical data refer to *concelho* and *circumscrição*.

TABLE I

WORLD TRADE IN COFFEE, 1958*
(In thousands of metric tons and percentages of total)

EXPORTS			IMPORTS		
Continents and countries	*Volume*	*Percentage*	*Continents and countries*	*Volume*	*Percentage*
South America	*1,186.1*	*56.4*	*Europe*	*774.1*	*35.8*
Brazil	793.7	37.8	Belgium-Luxembourg	51.9	2.3
Columbia	326.4	15.5	Denmark	37.3	1.7
Ecuador	30.4	1.4	Finland	31.3	1.4
Venezuela	35.6	1.7	France	189.1	8.7
			Germany, Western	159.7	7.3
North and Central America	*346.7*	*16.5*	Italy	81.5	3.7
Costa Rica	46.3	2.7	Netherlands	43.3	2.0
Dominican Republic	25.8	1.3	Norway	26.5	1.2
El Salvador	80.5	3.8	Portugal	10.8	0.5
Guatemala	61.8†	2.9	Spain	12.5	0.6
Haiti	20.7†	0.9	Sweden	62.9	2.8
Mexico	78.7	3.8	Switzerland	23.1	1.6
Nicaragua	22.9	1.1	United Kingdom	44.2	2.0
Africa	*522.6*	*24.4*	*North and Central America*	*1,264.3*	*58.5*
Angola	77.3	3.7	Canada	53.7	2.4
Belgian Congo	69.4	3.2	United States	1,210.6	56.1
Cameroons (Fr.)	26.5	1.3			
Ethiopia and Eritrea, Fed. of	50.2†	2.2	*South America*	*39.7*	*1.8*
French West Africa△	113.1	5.3	Argentina	39.7	1.8
Guinea, Rep. of	10.3	0.5			
Kenya	25.5	1.2	*Asia*	*35.8*	*1.6*
Malagasy Rep. (Madagascar)	47.8	2.1	Malaya and Singapore, Fed. of	35.8	1.6
Tanganyika	22.5	1.0	Turkey	.....	.....
Uganda	80.0	3.8			
			Africa	*48.6*	*2.3*
Asia	*58.4*	*2.8*	Algeria	27.3	1.2
Indonesia	27.2	1.3	Sudan	4.4	0.2
Malaya and Singapore, Fed. of	31.2	1.5	Union of South Africa	11.1	0.6
			United Arab Rep.: Egypt	5.8	0.3
World total	2,103.8	100	World total	2,162.5	100

*Source: U.N., F.A.O. *Monthly Bulletin of Agricultural Economics and Statistics*, Vol. VIII, Nos. 8/9, August–September 1959, p. 51. Data pertain to trade in hulled and unhulled green coffee only. The countries shown here account for about 95 per cent of world exports and 96 per cent of world imports.

†1957 figures.

△Ivory Coast alone, 112,500 tons.

harvesting of the cultivated berry and of the wild coffee berry from local subspontaneous plants gradually assumed importance in the back country of Luanda. At the turn of the 20th century a second coffee-producing area began to shape up to the south of the Cuanza River inland from the minor shipping points of Porto Amboím and Novo Redondo. After World War I, coffee was introduced to the slopes of the Uíge Plateau in the vicinity of Vila Marechal Carmona (then Uíge), this third area subsequently enlarging to the south and coalescing with the first coffee-growing area (Figs. 1, 3, and 9).

Transport difficulties, the small number of growers, lack of selective processing, and failure to promote the product abroad limited Angolan coffee output to what could be sold in the internal market and to metropolitan Portugal. Prior to the World Depression the average yearly harvest of green coffee fluctuated with a few rare exceptions between 8000 and 12,000 tons. But during the period 1935–1944 it increased to 46,500 tons, the highest in Africa, which made imperative the securing of foreign markets.[4]

[4] A. C. Valdez dos Santos, "Perspectivas da Economia Angolana," *Actividade Económica de Angola* (Luanda), Vol. III, Series A, No. 16, Sept., 1947, pp. 94–97.

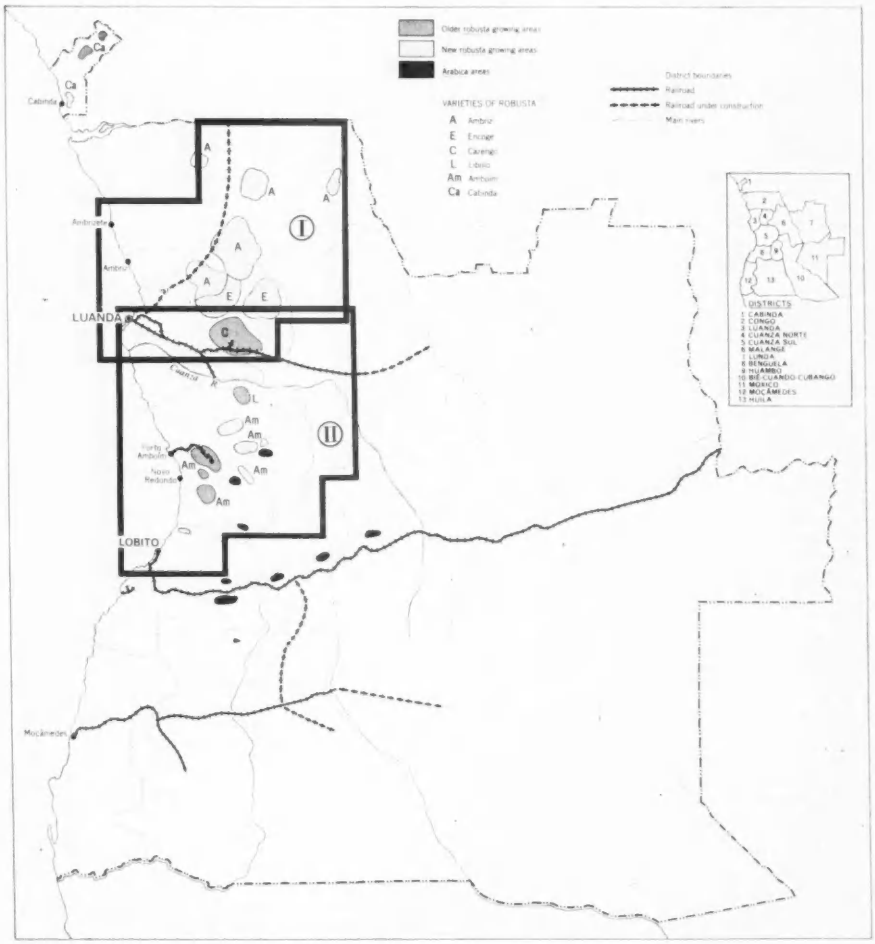


FIG. 1. Location of coffee-producing areas of Angola and of their points of shipment. The space delimited in I is enlarged in the main body of Figure 3; the space II is enlarged in Figure 9.

To achieve this goal a government-sponsored Coffee Board, *Junta de Exportação do Café do Ultramar*, was created in Lisbon during the early forties to coordinate production, extend technical advice to growers, assist in processing the berry, and introduce standardization of grades prior to shipment. Projects for coffee expansion were elaborated.[5]

[5] M. Ramos de Sousa: *A Junta de Exportação do Café Colonial em Angola—5 Anos de Actividade*, Luanda, 1946.

Over the period 1948–1958 Angolan land under *robusta* expanded from 302,785 to 631,337 acres and the average annual harvest since 1955 has been 80,000–85,000 tons. The small production of *arabica*, grown chiefly in the central highlands behind the port of Lobito (Fig. 1) rose from 250 tons in 1944 to about 1000 tons in the late fifties.

Figure 2 shows the annual values of

Angolan coffee exports from 1948 to 1958. Over that period the volume of coffee exports totalled 600,000 tons and had an aggregate value of 113.6 million contos (U. S. $405.3 million). When the *Junta do Café* came into being, coffee provided 14 per cent of the total value of domestic exports. It then competed with cane sugar for first place in value of national export crops; in tonnage, maize has long been Angola's foremost national export crop. In 1953, owing to exceptionally favorable world market prices, the share of coffee rose to 53 per cent of combined export values. During the following five years, it maintained a fairly steady level of about 44 per cent of total exports.

In the peak production year, 1956, close to 90,000 tons valued at 1,537,872 contos (c. U. S. $57 million) were exported. An estimated 55 per cent was shipped to the United States of America, 34 per cent directly and the remainder through re-exports from third countries. In 1957 and 1958, the United States bought 59 and 52.5 per cent respectively of all Angolan coffee, which brought 23.2 and 22.6 million dollars to the Foreign Exchange Fund of Angola.

The Netherlands, where per capita coffee consumption is very high, has usually ranked as Angola's second coffee buyer, taking between 15 and 20 per cent of total exportable production. Other habitual foreign customers for Angolan coffee are the United Kingdom, Belgium-Luxembourg, Western Germany, France, Norway, and Switzerland. Small quantities are often shipped to Finland, the Union of South Africa, and some Asian countries. Metropolitan Portugal's small market absorbs only 7 to 10 per cent. Until 1958 it bought only second and third grade beans, as certain regulations favored the sale of better grades to foreign markets.[6]

[6] All data on coffee trade are from Angola. Repartição Técnica de Estatística Geral. *Anuário Estatístico* 1948 and later years; *Relatório e Contas do Banco de Angola. Exercício de 1957*, pp. 36, 42, 76, and *Exercício de 1958*, pp. 76–78; and from information provided by *Junta do Café* officials in Luanda and Lisbon.

EXTERNAL EFFECTS OF COFFEE EXPANSION IN ANGOLA

The flow of Angolan coffee to the North American seaboard has revolutionized the former pattern of territorial external trade which, since the independence of Brazil (1822), had been oriented toward metropolitan Portugal

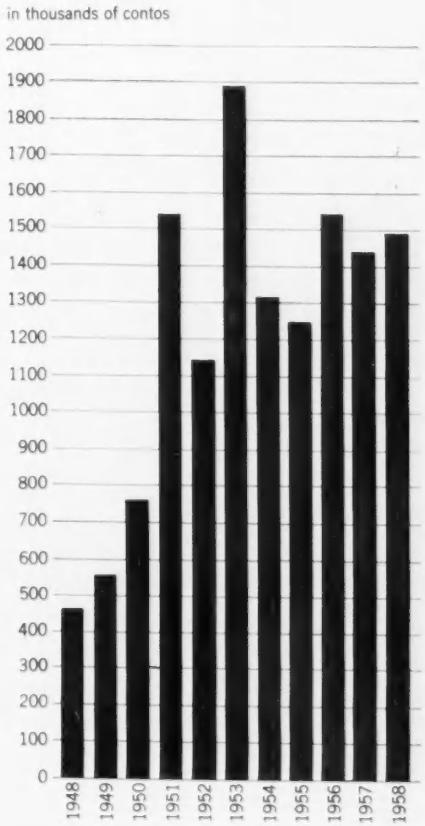


FIG. 2. Annual values of Angolan coffee exports for the period 1948–1958. (1 conto = U. S. $35.70.)

and several other countries of Western Europe. Before World War II, the metropole bought 43 per cent of all Angolan exports and supplied a similar percentage of all imports. In the immediate postwar years, Portugal continued to be Angola's first client but its share in that country's exports decreased to slightly over 20 per cent. Throughout the fifties, however, the United States became the leading destination of Angolan exports, accounting for 27 per cent of the total outgoing flow in 1957 and 1958.

Also, the United States emerged as the chief *foreign* source of Angolan imports. In 1953–1954 its part of territorial supplies was 16 per cent of the total, and American goods such as cars, jeeps, refrigerators, and miscellaneous appliances were prominently displayed in many stores of the larger Angolan cities. Under the pressure of falling coffee prices, certain restrictions on American imports were introduced in subsequent years to preserve territorial dollar-balances which benefit metropolitan Portugal as well as Angola. Thus, by 1957, imports from the United States had decreased to 13.6 per cent of the total and in 1958 they stood at 11.6 per cent.

Increasing exports of Angolan coffee have stimulated the movements of international shipping on that portion of the western African maritime route. Coffee traffic has attracted to some almost unknown points along the Angolan coast increasing numbers of foreign vessels, despite deficiencies of harbor site, scant port equipment, and diminutive total trade. The minor port of Ambriz, for instance, with a total cargo movement of 12,757 tons in 1957, was host in that year to 379,889 gross registered tons of deep-sea shipping.[7] Seventeen American vessels, 18 Belgian, one Dutch, one Norwegian, and one German anchored in its open roadstead, together with 18 Portuguese ships, to load 7239 tons of green coffee. In 1948 only three foreign ships had called, and in 1938 only one German ship.

Internal Effects of Coffee Expansion

Internal benefits to Angola because of its coffee boom have been numerous. Government receipts through export duties on coffee have financed an important share of expenditures in Angola under the first Six-Year Development Plan for metropolitan and overseas Portugal (*Plano do Fomento 1953–58*). To the struggling Portuguese immigrant farmer, who had previously been engaged in the unrewarding task of tilling low-value crops (*generos pobres*) in inimical tropical surroundings, coffee growing has meant new dignity, hope, and a higher standard of living. The settled African farmer has found in coffee a superior source of cash, while other parts of Angola have benefited through the pay received by migrant African laborers for work on coffee plantations.

Luanda, the capital city and the main coffee port of Angola, has blossomed on coffee profits. The upsurge of Carmona (the European urban population of which passed from 310 in 1950 to 2700 in 1957), municipal improvements at Vila Salazar, Lucala, and Gabela, and port works at minor coffee outlets were all the outcome of national coffee earnings. Receipts from coffee permitted university education in Portugal to children of coffee farmers who themselves had been able to attend only the first grades of elementary school. Profits

[7] Angola. Repartição de Estatística Geral. *Estatística da Navegação Marítima* 1957, Luanda, Imprensa Nacional, 1958, p. 14. All shipping and cargo port data in this study from 1949 on are from these annual releases, unless otherwise stated. Overseas port trade figures are from *Anuário Estatístico* of corresponding year, as well as the port movement figures prior to 1949.

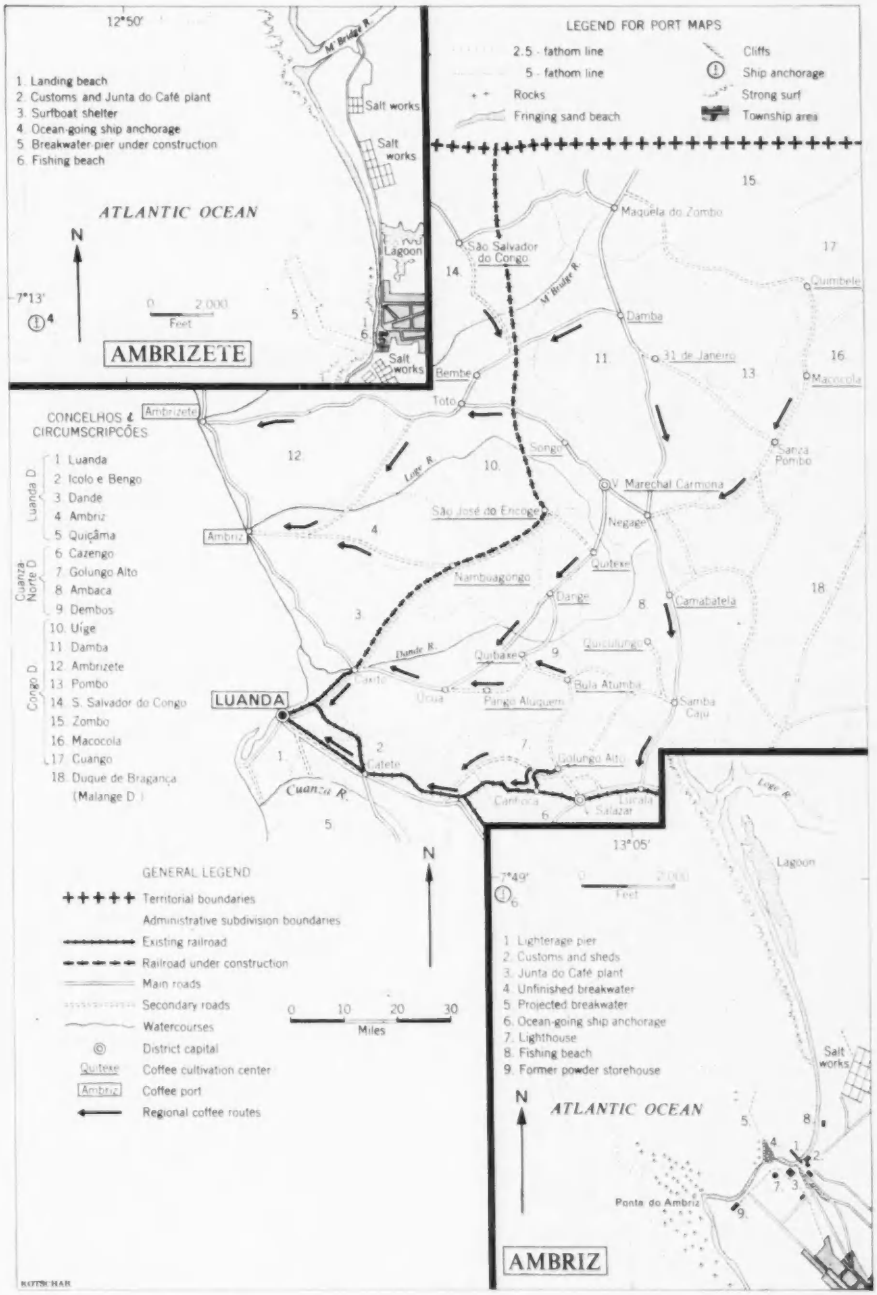


FIG. 3. The coffee region north of the Cuanza. Top and bottom insets show the principal features of the secondary regional coffee terminals, Ambrizete and Ambriz.

from coffee were also reinvested in Lisbon's real estate, contributing, for example, to much construction along *Avenida de Roma*, a leading modern artery of that capital.

On the adverse side of the balance sheet has been an excessive concentration of coffee growing in some parts of Angola, to the point of excluding other crop cultivation. Thus far, coffee monoculture has been chiefly responsible for making Carmona, the northern coffee capital, the most expensive city in which to live in all Angola. The consequences for the national economy could be more serious in the future because of mounting coffee surpluses on the world markets. Transfers of profits to wealthy absentee landlords, or as company dividends, have also been instrumental in aggravating the perennial-deficit in balance of payments between Angola and the metropole.

Labor demands on the part of coffee growers have led each year to an extensive displacement of African able-bodied men from their tribal villages, causing family hardship and depressing local birth rates. The complicated procedure of verifying the vacancy of the land before granting a concession has severely taxed some branches of government services, impeding the performance of other duties in the face of accumulating applications. Lastly, the "coffee rush" has encouraged speculative endeavors, begun without a basic minimum of sustenance, without thought to continuity, and sometimes on inappropriate soils. In times of difficult sales, the volume forthcoming from such "coffee adventurers" is bound to jeopardize the position of more serious planters.

COFFEE REGIONS

The new and older areas of coffee cultivation in Angola are shown in Fig. 1. If one disregards the small *robusta* production in the Cabinda District (the former Cabinda Enclave) and the *arabica* raised in several locations on the highlands of central Angola,[8] it is noticeable that coffee-producing areas fall into two broad regions. The first is located to the north of the Cuanza River, the main Angolan watercourse; the second is south of that river. The ecological environment for the coffee plant is not markedly dissimilar in the two regions, yet each has its special producing characteristics and its own ports of shipment which will be examined in turn.

THE REGION NORTH OF THE CUANZA

The region north of the Cuanza is the most important Angolan coffee region (Fig. 3), with 78.0 per cent of the national coffee acreage and 79.9 per cent of the total production, virtually all in *robusta*. In its broadest sense, it includes a large section of the Congo District, some of the Luanda and Malange Districts, and the entire Cuanza-Norte District. But the most important coffee areas within it are the *concelhos* of Ambaca, Dembos, Golungo Alto, and Cazengo in the Cuanza-Norte District (which produced 39,400 tons in 1957), and the concelho of Uíge in the Congo District (with 17,300 tons in 1957). These *concelhos* together supply about nine-tenths of regional commercial coffee output.

The Nambuangongo area in the Luanda District and the vicinity of Damba in the Congo District produce annually about 2000 tons each. São Salvador do Congo, Macocola, and Cuango, also in the Congo District, are the pioneer areas for northern coffee. Throughout the Malange District scattered *robusta*

[8] Altogether the *robusta* of the Cabinda District and the *arabica* of central Angola represent 2–3 per cent of total national land under coffee and of total coffee production. The coffee output of the Cabinda District is briefly examined in I. S. van Dongen, "Cabinda Enclave, Angola: Its Economy and Shipping Points," forthcoming.

planting is largely in the hands of Africans; a few tons of *arabica* also are raised.

Though in the smaller coffee region south of the Cuanza the production has remained almost stationary in the last eight years, the northern region has trebled its output over the same period. Much of the new coffee planting coming to bear after 1952–1953 is around the capital of the Congo District, Carmona. Sizable additions to regional land under coffee have been made, too, around Camabatela, Quibaxe, Bula Atumba, and Pango Aluquem in the Cuanza-Norte District.

As a rule, northern *robusta* cultivation is localized on the slopes of the so-called *subplateau* of Angola. This orographic belt of varying width ranges in elevation from 990 to 1650 feet at its lower level to between 2640 and 4620 feet at the top, and it marks in the whole territory the passage from the coastal lowland to interior uplands. Coffee plantations are mostly established at altitudes varying between 1320 and 3300 feet, but there are also a few in higher-lying country (up to 4290 feet) to the east and southeast of Carmona. In the southwest, there are instances of coffee being grown in the coastal lowland.

Over much of the section around Carmona a mean annual rainfall of 50–70 inches prevails in contrast to the insufficient precipitation of many parts of the country. Precipitation is concentrated in the six to seven months' warm season (extending from October or November into April), with a short interruption of the rainy season in December or January. Mean annual temperatures range between 73° and 79° F. occasionally going below 50° F. during the dry winter months of covered skies ("cacimbo") when coffee berries have matured.

The dominant natural vegetation of the coffee zone is a luxuriant tropical forest tumbling down the dissected slopes of the subplateau. Like many other African rainforests it is characterized by a great variety of tree species and denseness of stands, and by the presence of epiphytes and wild *elaeis* palm. Northern Angola's forest, however, is lighter and semideciduous, and the size of individual trees is less than that of the giant timber encountered in the dark, close-canopied *selva* which covers the equatorial sector of the Congo Republic and some of the Portuguese Maiombe region in the Cabinda District. In higher-lying country, savanna dominates, the rainforest subsisting only in patches or galleries along the streams (Fig. 4).

A complete study of regional coffee soils is still forthcoming. Some soils are derived from ancient gneisses and granites of the Basic Crystalline Complex of central Africa; others were formed from tillites and calcareous schists of the slightly younger Kundelungu and Bembe geological formations.[9] Many are laterized. Carmona's soils are basically argillaceous. Tentative efforts are now being made to introduce coffee to grasslands, since in the opinion of *Junta do Café* agronomers these savanna soils are of better structure than the forest soils. The early coffee plantings were all in partly-cleared forest land (Fig. 5) and this type of coffee environment is the one which continues to be in strongest demand among prospective coffee farmers.

It has been estimated that there are about 780 Europeans growing coffee north of the Cuanza on some 850 plantations.[10] Recent spot checks by the

[9] See A. L. Azevedo, *Esboço Pedológico da Provincia de Angola, 1954*, 1:4,000,000, Luanda, and "Os Solos de Angola e a Agricultura," *Agronomia Angolana*, No. 9, 1954, pp. 13–106.

[10] *Anuário Estatistico*, 1958, p. 88.

FIG. 4. This large estate, midway between Carmona and Negage, raises coffee in forest galleries along the streams. Attempts are being made to introduce livestock to its grassy areas.

Junta services, however, suggest that the official figures are much below reality. The present European coffee farmer of the north is usually a small or medium producer with an annual green-coffee harvest ranging from 1 to 600 tons. Most of the new *fazendas* or *roças* are of 300–500 acres, but not all land suitable for coffee has necessarily been put to use in such a holding. Older European coffee estates were established on much larger concessions (Fig. 4), sometimes up to 5000 acres, but due to limited capital these often remain partly undeveloped.[11]

[11] Work on such a large *fazenda* is described and other useful details on coffee cultivation in the Congo District are given in R. J. Hoūk, "Recent Developments in the Portuguese Congo," *Geogr. Rev.*, Vol. 48, 1958, pp. 201–21. Both *fazenda*, the Brazilian term for coffee estate, and *roça*, the São Tomé equivalent, are used in Angola to designate individual coffee plantations.

In contrast to the situation in the coffee region south of the Cuanza, the African farmer is an important contributor to northern coffee production. The number of regional African coffee farmers[12] is estimated at over 10,000; their output represents about 30 per cent of the over-all harvest (the exact share varying from *concelho* to *concelho*), and their yearly income from coffee is estimated at over 200,000 contos (U. S. $715,000). Damba production is chiefly African. Individual African production seldom reaches one ton; about 10 per cent achieve higher levels.

Because of African interest in coffee growing in a region of only moderate population density, European *fazendeiros*

[12] To be considered a genuine coffee farmer, the African has to maintain a minimum of 7.5 acres under reasonably good cultivation.

FIG. 5. Coffee grown under the shade of partly-cleared forest in the vicinity of Carmona.

face a serious problem of manpower.[13] Larger estates have resorted, at considerable expense, to licensed labor recruiting outside of the coffee country. Most of their workers are brought on one-year contract from the reservoirs of African labor on the central Angolan plateaus. The financial outlay for such recruitment is prohibitive for the smaller European grower who is obliged to rely essentially on the few available African volunteers.

This labor shortage and the high cost of transport to points of shipment on the seaboard combine with the attraction of coffee prices to keep the white farmer in the north addicted exclusively to coffee growing. From his coffee plantation and frequently from some form of petty commerce all his livelihood is derived. Only on rare occasions does he put other regional vegetable wealth, such as the oil palm, to use. Most of his daily food is purchased on the outside.[14] For the African, on the other hand, coffee represents chiefly a good source of supplementary income. Under the prodding of the *Junta do Café* agronomers in several government-promoted *colonatos*, or through joining in the customary tribal land cultivation by his wife, the local African has recently more and more taken to raising various food staples for his subsistence. Sometimes this food production is not of sufficient volume for all his needs, but at other times considerable crop surpluses of maize, manioc, beans, and groundnuts are placed for sale on local markets.

Most of the region's coffee is harvested during the months of June to September. On large European estates, the ripe berries are dried and processed, the green coffee bean being thus reduced to one-fifth of its initial weight. It is then bagged in 60-kg. bags and shipped to the seaboard, usually by truck. Another cleaning, polishing, grading, and resacking takes place just before sea embarkation at the *Junta's* regional reconditioning plants located at Luanda, Ambriz, and Ambrizete. Smaller growers without their own processing machinery, and the big *fazendeiro* in case of an over-abundant harvest, use the facilities of the *Junta's* hulling plants at Carmona, Negage, and Golungo Alto, against the payment of a small fixed price per kilo treated. Several European commercial firms at Carmona or other centers, acting as agents for large coffee exporting firms, specialize in collecting small planters' produce at that stage. Many Africans, however, only sun-dry the berry before sell-

[13] According to 1950 census, the five chief coffee-producing *concelhos* of the north contained 123,700 African males of *all ages*, whereas over 53,000 African laborers were reportedly employed there in 1957 solely on the European plantations.

[14] Coffee growing in the north, under normal conditions, would give a net income of c. U. S. $30 per acre at 1957 prices (Estimates by A. Sousa de Santos, Head of *Junta's* Regional Experimental Station at Carmona, to whose courtesy is due much of the information on coffee growing in the Congo District).

ing it to European petty traders, although this brings much lower financial returns.

COFFEE PORTS NORTH OF THE CUANZA

Theoretically, all northern coffee production is in the hinterland of the port of Luanda. The modern wharfs of this main gateway to the north can be reached from coffee areas by rail or road. Various circumstances have nonetheless resulted in the flow of some regional coffee to Ambriz and Ambrizete. Over 82 per cent of the national coffee export tonnage moved through these two outlets and Luanda during the period 1954–1958. For 1958, coffee traffic represented 27.5 per cent of all outgoing overseas tonnage at Luanda, 89.5 per cent at Ambriz, and 99.0 per cent at Ambrizete. The combined value of coffee shipments at the three ports stood at about 80 per cent of their total exports by value.

The *robusta* of the north is differentiated on the world markets into three varieties: *Ambriz*, *Encoge*, and *Cazengo*, each grown in a definite zone. The *Ambriz* of the first and second grade has always ranked first overseas because of its outstanding capacity to absorb the flavor of finer *arabica* coffees which are mixed with it in the preparation of common coffee blends. A key factor in the patronizing by international shipping of the open roadsteads of Ambriz and Ambrizete (Fig. 3, bottom and top insets) has been the desire to ensure for the buyers the authenticity of coffee lots of desired origin. Luanda, with a superior deepwater port, has been unable to provide such guarantee because its *Junta do Café* reconditioning plant receives all the northern coffee varieties and even the *Libolo* and the *Amboím* (or *Novo Redondo*) varieties from the coffee region south of the Cuanza.[15]

Luanda

The terminal of Luanda with its land and maritime flow of traffic, including coffee, was recently covered in a comprehensive study to which the reader is referred to avoid repetition.[16] In the present article only Luanda's relationship with the secondary northern coffee ports will be examined.

In the early years of coffee cultivation the main rail trunk from Luanda to Malange, together with the 20-mile narrow gauge branch to Golungo Alto, offered a fairly adequate evacuation route for planters in the *concelho* of Cazengo (Fig. 3). As coffee growing moved northward from the rail belt, the railheads of Vila Salazar and Lucala became collecting points for shipments which arrived by road from the *concelho* of Ambaca. Lacking rail services, the growers in the *concelho* of Dembos trucked their crop 140 miles from Quibaxe to Luanda, via Úcua and Caxito.

The expansion of coffee growing around Carmona presented a more acute transport problem for the shippers because of the trucking distances involved, the costs of haul, and the inconvenience of a break-of-bulk at Lucala if that railhead were used. The distance between Carmona and Luanda was *then* 248 miles by road, via Úcua and Caxito, and 334 miles by road and rail, via Camabatela and Lucala. On the other hand, only 200 miles separate the area from Ambriz or Ambrizete; the coffee farms

[15] No recent data are available on respective shares of each of these *robusta* varieties in Angola's over-all coffee exports. In 1945, when the northern coffee crop was 65 per cent of national production, the breakdown was as follows, according to M. Ramos de Sousa, *op. cit.*, p. 107:

Ambriz	21.1%	*Amboím* (or *Novo Redondo*)	34.2%
Encoge	23.4%	*Libolo*	1.7%
Cazengo	18.4%		

[16] I. S. van Dongen, "The Port of Luanda in the Economy of Angola," *Boletim da Sociedade de Geografia de Lisboa*—Jan.–Mar. 1960, pp. 3–43.

at Songo lie only 170 miles from these possible points of shipment overseas. It was natural that much of the coffee flow from the Uíge area would be directed there in preference to Luanda. Up to 1951, Ambriz and Ambrizete competed strenuously for the position of second northern coffee outlet, with Ambriz emerging definitely as the leader in subsequent years. In the mid-fifties, the distribution of coffee exports from the region north of the Cuanza was about 71 per cent to Luanda, 22.5 per cent to Ambriz and 6.5 per cent to Ambrizete.

Ambriz

The fortunes of the historical Portuguese outpost of Ambriz have fluctuated widely since its foundation in the early nineteenth century. Loge River which enters the Atlantic just north of the township was for a long time a *de-facto* political frontier between the Portuguese kingdom of Angola and the kingdom of Congo ruled by an African potentate. The first territory had Luanda as its main port and after 1850 used Ambriz also; the second had a shipping point at the mouth of the Congo River near the present small port of Santo António do Zaire.

At the Berlin Conference (1885), the Loge became the southern boundary of the conventional Congo Basin with its distinct international trade and customs regime. The proximity of Ambriz to Belgian Africa drew to it some trade of the Belgian Lower Congo area, via several porterage routes and, at the turn of the century, Ambriz was receiving a few calls from ocean-going ships. Belgian interest in the port continued up to the treaty of Versailles (1919), when they sought to secure it as a Belgian Congo ocean head.

Even before the pacification of all northern Angola was completed in 1923, men from Ambriz had moved inland founding the settlements of Uíge, Damba, and Maquela do Zombo. An accessory point of shipment, Ambrizete, was also established some 60 miles up the coast, within the Congo Basin area. Plans for effective links with the interior were formed, proposing either to blow up some rapids on the Loge for a water route, or to lay a rail line along the left bank of the river in the direction of São José de Encoge.

Completion of Luanda's trunk line to Malange in 1926 thwarted Ambriz' hopes for development, as more and more of northern Angolan traffic began to move along that track and via Luanda. Ambrizete had the advantage of obtaining first a better road connection with interior centers and, encouraged by a temporary absence of export duties on coffee, traffic moved toward that outlet, progressively forsaking Ambriz. On the eve of World War II, the port handled only 2429 tons of total overseas trade valued at 4878 contos, against Ambrizete's 4065 tons and 7506 contos. Its coffee trade was only 6.2 per cent of all Angola's, while Ambrizete's was 19.2 per cent.

In the late forties, however, Ambriz was resurrected by strong local initiative, the introduction of a coffee export tax at Ambrizete, and the deterioration of Ambrizete's branch of the common road feeder from Carmona. From 1948 to 1957 its overseas goods movement passed from 6613 to 11,496 tons and the value of this overseas trade from 40,500 contos (about U. S. $1.4 million) to some 190,000 contos (U. S. $6.8 million). The year 1958 reflected all over Angola the effects of the temporary recession in the economy of the United States and the port totals descended to 8773 tons and some 140,000 contos (U. S. $5 million).

The slight indentation in the northern

Angolan coastline where Ambriz is located offers no refuge to deep-sea shipping (Fig. 3, bottom inset). Shallow littoral waters oblige the vessels to anchor at least 1 mile from the shoreline and to be worked over a distance of about 1.5 miles from the lighterage pier. Poor natural features of the site, however, were quite ingeniously utilized by the Ambriz community. The first 198-foot section of the present pier was constructed at the town residents' own expense in the partial shelter of Ponta do Ambriz and of an unfinished breakwater. A shed and customs house were built at its head and a rudimentary lighterage fleet assembled. Even some 65 miles of feeder road were laboriously laid inland in an attempt to recapture the coffee traffic from Ambrizete. A government grant in 1954 finally permitted lengthening the pier by 132 feet (Fig. 6), purchasing 50-ton lighters and two tugs, and installing a small crane. To have really adequate port facilities would require the construction of a breakwater about 825 yards long. Aid for this has not yet been made available by the government. Meanwhile, efficient handling of outgoing coffee shipments by private port operators, *João Martins & Cia*, has done much toward reducing the turnaround time of deep-sea callers which can now be loaded at a rate of 500 tons per day.

Since it has surpassed Ambrizete in northern coffee trade, Ambriz' main traffic has been direct coffee exports to the United States and the North Sea European ports. These foreign coffee exports have recently represented about two-thirds of the port's total overseas trade (Fig. 7). All of it is carried in foreign-flag vessels, whereas Portuguese ships account for all imports and very small diversified exports to Portugal, such as coffee and cacao from the eastern section of the *concelho* of Ambriz, palm products from a company estate on the Loge, and groundnuts and cotton raised locally by Africans. Tonnages unloaded from Portuguese bottoms outweigh the loaded by a ratio of 4 or 5 to 1.

Coastwise trade, which was formerly rather active (1500 to 2500 tons yearly), has now less meaning in the operation of the port because Ambriz lies only 112 miles from Luanda. The poor state of the coastal road connection, however, prevents its intensive utilization by truckers. Petroleum fuels generally come from the capital by road, but miscellaneous goods are often brought by coasters. There has been a regular outbound movement, either to Luanda or to the Republic of the Congo (Belgian Congo) ports in the Congo Estuary, of salt from large local salt works.

Buoyant coffee sales and port improvements during the mid-fifties made Ambriz believe once more that a brisker maritime trade would follow in the future. Township population rose somewhat,[17] local petty commerce was strengthened, and many urban improvements were undertaken. The coffee tonnages handled by the port did show a slight rise in subsequent years, but there has been a decline in its share of the northern coffee flow in favor of Luanda. By 1958 the breakdown was 89 per cent for the latter terminal, 10 per cent for Ambriz, and 1 per cent for Ambrizete. A realignment and sectional bituminization of the highway from Carmona to Luanda had shortened the distance by about 40 miles and permitted a reduction in travel time between the two cities. Moreover, by hauling the coffee to Luanda rather than to minor ports, truckers were assured of better return loadings. There were

[17] From 350 whites and assimilated, and 3950 Africans in 1948; to 525 and 5150 of same in 1957 (Local Administration Records, through courtesy of *J. Martins & Cia*, to whom are due most of Ambriz' port trade data).

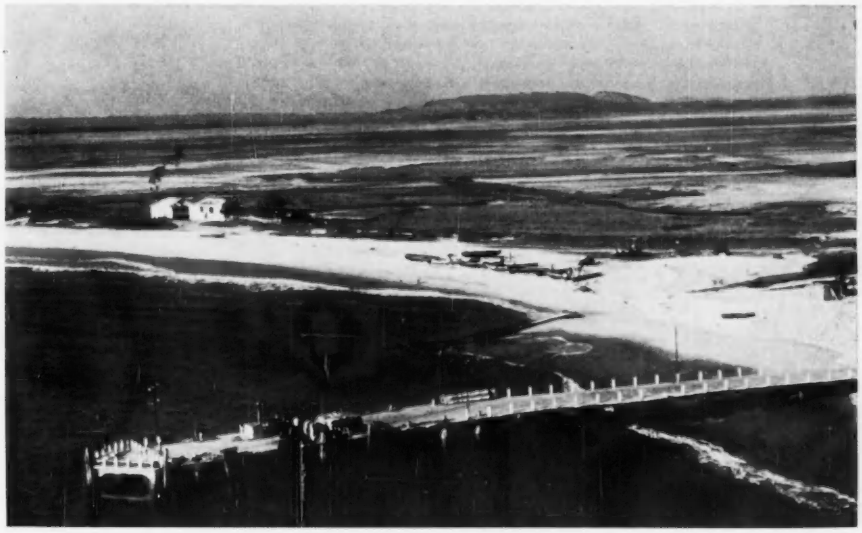


FIG. 6. The present lighterage pier at Ambriz coffee terminal. In the background is the alluvial plain of Loge River.

manufactured products from that city's new industrial plants to be moved inland, and coffee-rich Carmona had a high demand for luxury goods that were distributed by firms located in the capital.

Ambrizete

The maritime site and cargo working conditions at Ambrizete are much worse than at Ambriz. A rocky submarine shelf extending some distance from the shore prevents deep-sea vessels from approaching the coast closer than about two miles (Fig. 3, top inset). Seas in this locality tend to run to sudden strong swells, with waves that may reach 15 feet in storms. A heavy surf normally pounds the beach in front of the township where the embarking of coffee is done by means of a few surfboats (Fig. 8). At nightfall, loading is stopped and surfboats seek shelter in the mouth of M'Bridge River, about two miles north, to be rowed back in the morning. In the absence of any motorized traction and because of the difficult seas, land-ship transfer of 280 tons of coffee may take as much as three or four days. Frequently, the masters of vessels have ordered the anchor lifted in the midst of loading operations and have steamed away to avoid further delays in the ship's voyage or impending foul weather.

On several occasions during the twenties and thirties, plans were made to equip the shipping point with a small lighterage pier. These projects were always shelved due to a general lack of funds and destructive sea conditions. The customs differential of the Congo Basin in favor of Ambrizete managed to keep the small port alive until World War II, and the sudden rise in Angolan coffee production after 1948 allowed it to share to some extent in the mounting regional coffee traffic. But loading handicaps, sometimes involving damage to coffee just after it had been carefully

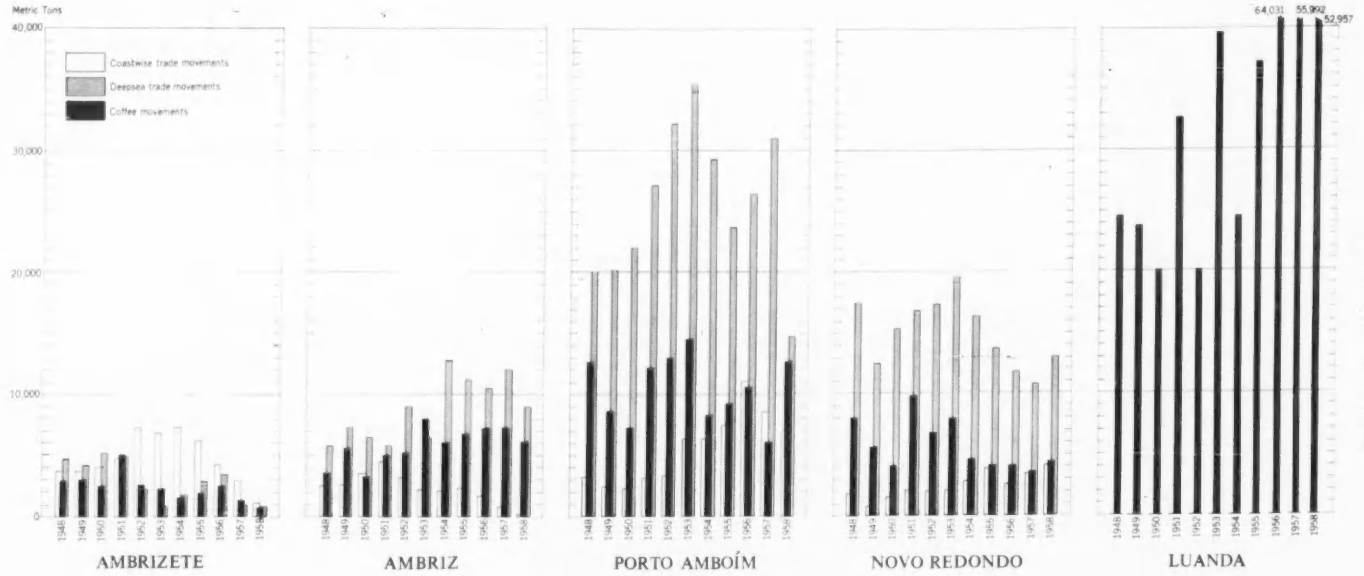


FIG. 7. Evolution of deep sea and coastwise trade at Angolan secondary coffee terminals from 1948 to 1958. Note comparative coffee movements through various exporting ports, inclusive of Luanda.

treated at the *Junta do Café* plant, showed the necessity for the construction of some sort of a breakwater. To raise the necessary funds, an additional levy on port imports and exports was introduced. Rather than yielding increased receipts, this led to a greater reluctance of inland shippers to route cargo via Ambrizete, while the inconveniences endured by ocean-going shipping resulted in its near abandonment by Portuguese and foreign-flag vessels. From 1951 to 1957 the value of Ambrizete's overseas trade fell gradually from 138,584 (c. U. S. $5 million) to 30,863 contos (U. S. $1.1 million) and overseas cargo movement from 2297 to 2240 tons (Fig. 7).

In 1957 only four deep-sea ships—all American—anchored in the roadstead, lifting 980 tons of coffee booked for New York and New Orleans. The rest of Ambrizete's callers were all coasters engaged in Angola's internal trade or in the transport of cargo subject to transshipment at Luanda (c. 435 tons). These coasters normally take out additional tonnages of coffee, salt from local salt pans, groundnuts, sesame, and citrus fruit from the vicinity of São Salvador do Congo, and empty containers for reuse. Incoming shipments are food supplies for the population of the township and assorted manufactures for trade with Africans by Ambrizete's handful of shop owners.

Coasters' movements at Ambrizete have always been on a larger scale than at Ambriz, reaching as much as 6000 tons of cargo in the mid-fifties. This has reflected a greater road distance (180 miles) from Luanda, the poor state of the coastal road connection, and the inadequacy of the ferrying service over the Loge, where most heavy vehicles must be partly unloaded and reloaded in addition to waiting a considerable time for the actual crossing. But even the coastal traffic was dwindling in 1956–1957, reflecting the economic decline of the outlet. In 1958, only 1113 tons of cargo moved in total overseas trade (direct or in transshipment) and under 1000 tons in domestic coastal trade. Shipments of coffee to the United States were down 50 per cent.

To avoid a complete extinction of the small port, which might one day be of use in the development of the northwestern section of Angola, especially if certain local irrigation projects were carried out, the Angolan government decided to invest 7930 contos (c. U. S. $280,000) in the building of a combination breakwater-pier. Ocean-going vessels are still to be worked in the roadstead, but coasters and lighters should be able to lie alongside in depths of 11–13 feet in quieter waters. Work on the structure, some 1485 feet in length, is now in progress.

Regarding the future of both Ambriz and Ambrizete as points of coffee shipment, it is believed that the first is likely to suffer more than the second from the effects of construction of the Congo Railway now being extended from Luanda towards the Republic of the Congo (Belgian Congo) frontier, via São José do Encoge. The line should pass within 120 miles of Ambrizete, whereas Ambriz would lie 60 miles away. This would doubtless result in the capture of present coffee traffic originating at Nambuangongo and São José do Encoge. However, if the alignment of the Congo Railway does not take in Carmona—which it will not, according to the latest plans—the present pattern of through trucking to the seaboard from that area may persist. This would tend to sustain the existing port installations at Ambriz, if means can be found by the community to check the present tendency of truckers to use the route to Luanda. Alternatively, a determined

FIG. 8. *Robusta* coffee being loaded into surfboats at Ambrizete. Rough seas are typical of conditions at that port.

effort should be made to uncover exploitable resources in the vicinity of Ambriz in order to provide the terminal with a minimum of trade volume.

THE REGION SOUTH OF THE CUANZA

The second major Angolan coffee region accounts for about 20 per cent of the total national coffee acreage and 18 per cent of the total output (Fig. 9). Varieties of *robusta* grown there are known as *Amboím* (also called *Novo Redondo*) and *Libolo*. With the exception of a few hundred tons of *robusta* raised to the northeast of Lobito, all of the region is within the limits of the Cuanza-Sul District. The *concelhos* of Amboím, Seles, and Libolo are the chief and the oldest producers (totalling 13,887 tons at the harvest of 1957). Amboím alone contains close to two-fifths of the regional land under coffee and yields over one-half of the regional harvest. Seles' production is about one-third of the total. The *concelhos* of Novo Redondo, Cela, and Quibala have lately contributed c. 200–300 tons each. About 50 tons of *arabica* coffee was also forthcoming from the region in 1957.

As in the northern coffee region, most of the plantations south of the Cuanza are established on the slopes of the subplateau under the protective shade of partly-cleared rainforest (Fig. 10). The width of that zone being more restricted in the middle sector of Angola, there is less forest land available for expansion. Recently-developed coffee areas are already in the park-savanna of the plateau at altitudes up to 4950 feet. Higher elevations and greater distance from the equator result in mean annual temperatures lower by several degrees from

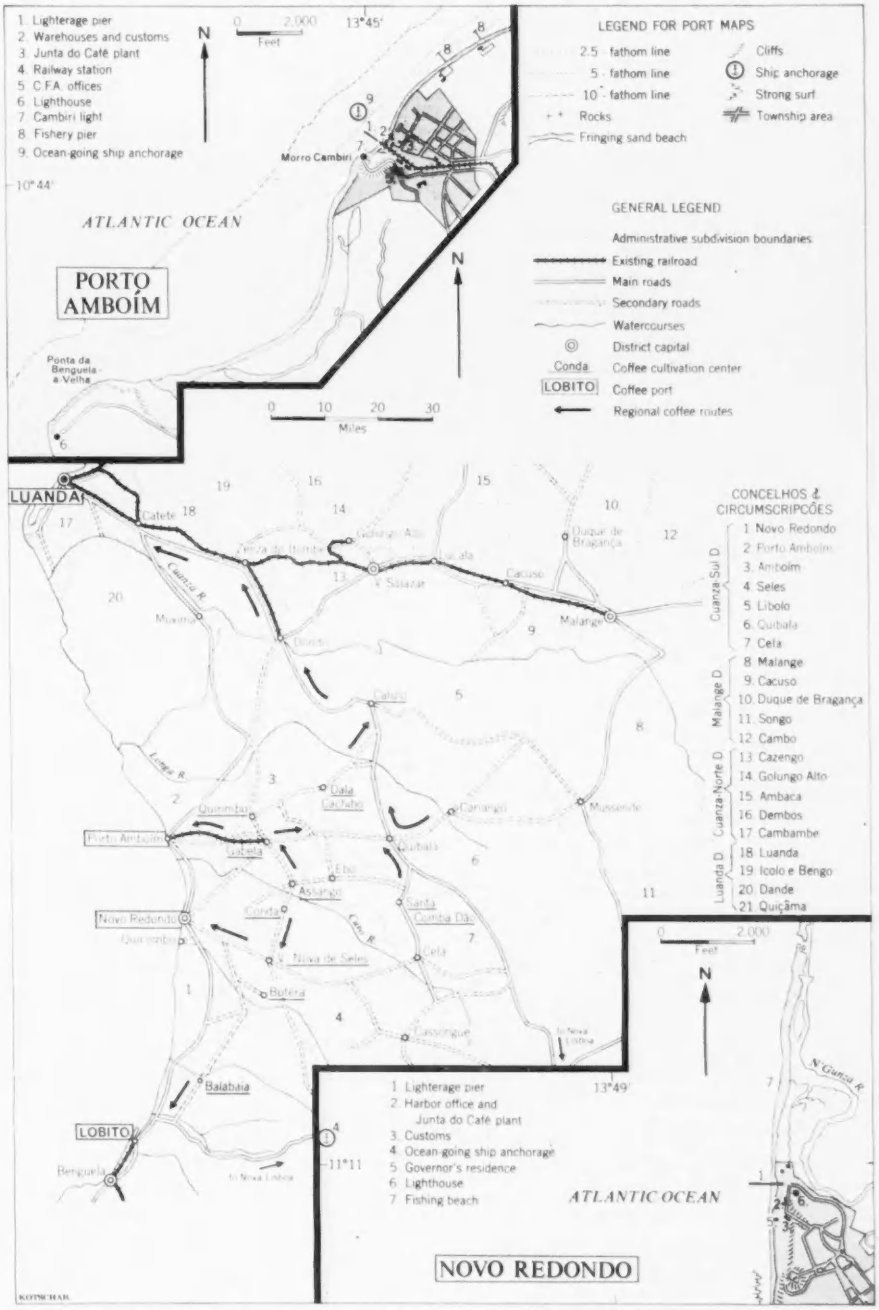


FIG. 9. The coffee region south of the Cuanza. The top and bottom insets show the regional coffee terminals, Porto Amboim and Novo Redondo.

those in the north; local minima, however, seldom go below 53° F. Precipitation in this area is often below 60 inches a year.

Soils in the Calulo area of the *concelho* of Libolo are similar to those of the northern sub-region of Cazengo, which produces similar coffee. The red, clayey soils of the Amboím are reputed to be the best coffee soils of Angola in structure and nutrients. When properly cared for they produce a bean rated even higher than the *Ambriz* variety of the north. Like most tropical soils, however, they are subject to rather rapid degradation. The dwindling of the output and the appearance of several coffee diseases around Vila Nova de Seles are thought to be due to soil exhaustion. Coffee cultivation in the Amboím-Seles area dates to the turn of the century, and only of late have many farmers become aware of the necessity of soil restoration.

Beyond ecological differences between the northern and southern coffee regions, organizational differences are to be noted. Firstly, African production in the south is very limited except in the *concelho* of Amboím. Even there a drop has occurred in the last few years from about 10 to 5 per cent of the total harvest. Secondly, the bulk of European-produced coffee comes not from individual small or medium-size farms, but from the holdings of three or four large companies, the foremost of which is C. A. D. A. (*Companhia Angolana de Agricultura*), which has some 320,000 acres of coffee in production and 74,000 acres which will enter the bearing stage shortly.[18] Other important coffee growing firms which augment their own croppings through purchases from small growers are *Mário Cunha, Lda.; Marques Seixas, & Cia, Lda.;* and *José Cardoso de Matos, Lda.* A third divergent feature from the north is a more diversified regional agricultural production. C. A. D. A. exploits a substantial acreage under *elaeis* palm. Some Europeans grow sisal. Africans account for sizable maize and cotton exports, besides producing the customary food staples. Cattle are raised in a few places. At times, castor seed and wheat cultivation achieve some importance.

Statistics on the number of Europeans engaged in regional coffee growing are incomplete as they are in the north. Officially there are 505 farms and 444 farmers. A particular feature of the Libolo area is the presence of a fair number of German planters. The small European grower's average coffee yield in the *concelho* of Amboím is 370 lb. per acre. C. A. D. A., with its trained staff of agricultural technicians and advanced coffee cultivation methods, has yields well above 450 lbs.

As in the north, there is such a labor shortage[19] that a permanent re-settlement of Africans from the central part of Angola to this zone has frequently been urged on the Angolan government. Small European growers can often muster only one-half or two-thirds of the required manpower at harvest time. C. A. D. A. recruits at least 5000–6000 of its 9000–10,000 African coffee workers in various parts of Angola through publicity done on its behalf by local European shopkeepers who benefit from increased sales, and who are paid for transporting and equipping the laborers and their families. Exacting daily norms are imposed on the men, but they are also offered excellent conditions in food,

[18] Most of the information on C. A. D. A. and the Amboím area was received through the courtesy of M. Sampaio de Mello, formerly on C. A. D. A. staff, and now Chairman of *Associação Comercial e Agrícola do Amboím*, Gabela.

[19] The 1950 census indicated a total African male population of 83,000 for the *concelhos* of Amboím and Seles, whereas the 1957 coffee employment figures in the same area were over 23,000 laborers.

FIG. 10. Forest clad slopes of the Amboím range are the most important coffee producing area south of the Cuanza. At its foot a wide stretch of coastal lowland is spanned by the C. F. A. rail line. (Direcção dos Serviços de Economia, Secção de Publicidade.)

lodging, and children's education, which are virtually unmatched by other European agricultural enterprises in tropical Africa. Workers' wives and daughters can earn extra cash by doing the final handsorting of the green coffee bean destined to ensure the high quality of the C. A. D. A. product.

Gabela, the seat of the *concelho* of Amboím, at the edge of the interior plateau, is the southern coffee capital. Despite its invigorating highland climate and the remarkable drive of its inhabitants, it has not managed to achieve the prestige of Carmona in the north. Total coffee production of the vicinity equals only half of the *concelho* of Uíge. The chief producer, C. A. D. A., does not contribute importantly to Gabela's life because it maintains a self-sufficient community of some 1000 whites (including families) at Boa Entrada, a few miles outside of the town. Successive administrative reorganizations in Angola failed to recognize that Gabela would be much better suited for the site of a modern district capital than the historical headquarters of the Cuanza-Sul District at Novo Redondo. As a result, existing road communications were permitted to deteriorate, the potential of the rail connection with the seaboard at Porto Amboím has not been fully exploited, and, despite a long-standing need, Gabela remains without air service.

COFFEE PORTS SOUTH OF THE CUANZA

The southern coffee region, like the northern one, has its own railroad, *Caminho de Ferro do Amboím* (C. F. A.), constructed originally to serve the developing coffee estates of a company now owned by C. A. D. A. It is a much shorter line (77 miles), has a narrower

gauge (2 feet), and is based on a less favorable port. Were it properly maintained, it could still handle practically all regional traffic.

The flow of coffee in the south is, however, dispersed. Coffee growers of the Libolo area either use the highway that connects the central and northern rail lines of Angola, via Quibala and Calulo, to bring their crop to the 50–60 mile distant railhead of Dondo on the northern rail system, or through-truck their produce over the 190 miles to Luanda. Growers located east of Gabela favor the same route. Around Gabela proper, many small planters also move their crop over some 290 miles to Luanda rather than moving it by rail to Porto Amboím. This is explained in part by the present inadequacies of the Porto Amboím route and in part by the fact that most local shopkeepers, who are frequently coffee producers as well, are obliged in any case to send their motor vehicles to Luanda to secure their trading supplies from the big distributors of the capital. Furthermore, some coffee growers are reluctant to prepare the beans properly to meet the export standards of the *Junta do Café* controllers at Porto Amboím and Novo Redondo. This coffee is directed to Luanda to be sold on the internal market or to be exported as "coffee for industrial uses."

The coffee crop from the *concelho* of Seles is normally exported through the terminal of Novo Redondo, reflecting primarily the hold of commercial interests sited there. The *robusta* from Balabaia is routed to the central Angolan gateway of Lobito, which otherwise confines its coffee handling activities to the small tonnage of *arabica* raised in the central uplands. Only the C. A. D. A. coffee plantations ship their full output via the rail and terminal of Porto Amboím.

It is believed that from 2000 to 2500 tons of coffee produced in the primary hinterland of Porto Amboím bypasses the regional ocean head in favor of Luanda each year, and that the value of trade thus lost equals 20–25 per cent of the outlet's present trade. Novo Redondo further subtracts from Porto Amboím about one-third of the remaining exportable coffee production. Because of a dichotomy of regional port functions, handling facilities at these two ports are not completely utilized, local coffee and maize reconditioning plants often stand idle, and a chronic operational deficit exists on the railroad, requiring continued financial support of its private owners by the Portuguese State, in accordance with the terms of the initial concession.

Porto Amboím

Both points of shipment south of the Cuanza are open roadsteads (Fig. 9, top and bottom insets). Porto Amboím, however, has the advantage over all secondary Angolan coffee outlets of fairly deep littoral waters. In normal weather, deep-sea vessels can anchor only 200–300 yards from the lighterage pier, reducing the time required for loading and unloading (Fig. 11). The force of the ocean's waves is partly subdued by the outlying headland of Ponta de Benguela-a-Velha and some protection is given to operations at the pier by the jutting rock of Morro Cambiri. Rough water conditions do not occur more than 30 days a year.

Upon completion in 1923–1925 of the first 50-mile section of C. F. A. rail line across the coastal lowland, a small wooden jetty was built at Porto Amboím. Just before World War II, that port had a total traffic of some 12,000 tons, of which 25 per cent were coffee exports; the largest traffic was in maize. The second rail section, which painfully

negotiates the 2310-foot escarpment to Gabela, was finished in 1941.[20] By 1948, coffee represented 60 per cent of the port's total movement which had risen to 22,000 tons. The value of the port's trade increased from 17,689 contos in 1938 to 153,632 contos (U. S. $5.5 million) in 1948.

The years 1952 and 1953 were the most profitable for the port, with coffee shipments reaching over 70 per cent of all overseas exports and trade values soaring correspondingly to 413,863 and 503,021 contos (U. S. $18 million). The railroad movement was at a peak of 33,398 tons. Almost half of the outgoing coffee was booked for the United States of America, and United States flag ships represented in gross registered tonnage nearly one-third of all deep-sea shipping calling at Porto Amboim.

With the port operating at full capacity, new installations became imperative. A concrete pier, 136 yards long and with alongside depths of 15–16 feet, replaced the decaying old jetty with the assistance of a government loan of 6000 contos (U. S. $214,000) to C. F. A. A modern warehouse was constructed by C. A. D. A. for its own needs, to supplement the storage space existing at C. F. A. and at the *Junta do Café* plant. Motorized traction of lighters was introduced, the C. F. A. lighter fleet was raised to 300-ton capacity, and some private lighters and another 5-ton crane were added. Potential port handling capacity was thus increased to an estimated 120,000 tons per year.

[20] The C. F. A. track winds up the forested slopes of Serra do Amboim (Fig. 10) to an altitude of 3510 feet. After the station of Lacetes, 54 miles from the coast, most gradients are 3 per cent and the curve radius is often 165 feet. The small, 42-ton locomotives can haul trainloads of about 150 tons downward, but loads have to be reduced to 75 tons when working upline. (Information courtesy C. F. A., which also provided most of the data on the port and railroad.)

Instead of registering further expansion, the overseas trade of the outlet remained stationary or occasionally declined during subsequent years (Fig. 7). Continued development of motor transport throughout Angola activated the transfer of regionally-grown coffee toward Luanda. Several climatically unfavorable seasons resulted in poor coffee harvests at C. A. D. A. The volume of overseas imports at the port showed particular weakness as several commodities disappeared from the terminal's list. Petroleum fuels, for example, were received in most of the hinterland directly by truck from Luanda or Lobito. With the installation of cement manufacturing plants in these two cities, cement came in coastwise trade. Imports of capital goods were on a trifling scale, since the impoverished C. F. A. could not order new equipment, and economic development of several localities in the Cuanza-Sul District was handicapped by official nurturing of Novo Redondo. From 1955 to 1958 incoming tonnages from overseas fell from one-third to one-fifth of total port movement and consisted largely of wine from the metropole unloaded from Portuguese ships.

Paralleling the decreases in coffee and import flow, the yearly values of Porto Amboim's trade declined steadily from 1954 to 1957. In the latter year coffee represented only 30 per cent of outgoing tonnage and the port's total trade value was only 244,037 contos (U. S. $8.7 million). Fishmeal from fisheries that had recently sprung up on the local seaboard led the list of overseas exports with 8215 tons. Palm oil and kernels from C. A. D. A. plus sisal and maize totalled over 25 per cent of outbound cargo; additional outward shipments were fish oil, cotton fiber, and cottonseed. In 1958, coffee traffic shot up to

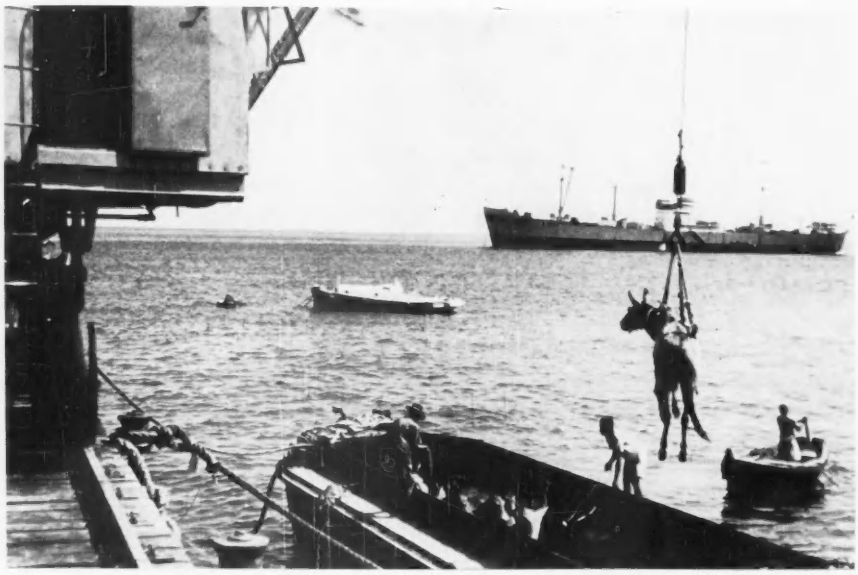


FIG. 11. Rapid lighterage of seaborne cargo is facilitated at Porto Amboim by the depth of littoral waters which allow ocean-going vessels to anchor a short distance from the pier. In this picture, mules from the Açores, destined for the C. A. D. A. plantations, are being unloaded.

12,713 tons and the value of the port's trade soared correspondingly.

Much of C. A. D. A. coffee is now bought by the Netherlands, with the consequence that Dutch vessels have become the most frequent foreign-flag callers at the port, averaging two or more entries per month. Germany, Norway, Sweden, and Belgium are each represented by several ships a year. After 1953, there was a decrease in the United States calls to one vessel only in 1957. In 1958, however, the Americans returned to the port in some force.

In contrast with the overseas trade, Angolan coastwise trade at Porto Amboim definitely expanded following improvements at that port. Inbound shipments, which dominate in a ratio of 6 or 8 to 1, are mostly food supplies and sundry merchandise destined to the African population of the vicinity. Also notable are manufactures from Luanda's new industrial undertakings. Outgoing shipments are almost entirely salted and dried fish. Aside from the port-railway operations, limited petty trade, and fisheries, the township and its vicinity have not developed any economic activities. Compared to many other small localities of Angola, Porto Amboim[21] has stagnated in recent years and possible exploitation of the area's resources (stock raising on good pastures a short distance inland, sea-resort industry, etc.) have been entirely neglected.

Novo Redondo

Novo Redondo is situated 60 miles south of Porto Amboim. Its pier protrudes from a straight sandy flat lying below the main part of the town dispersed on rocky hills above. Depths

[21] In mid-1958, the town's white and assimilated population was about 750 and the African population about 10,000.

suitable for anchorage of deep-sea vessels can be encountered only two miles offshore; even shallow-draft vessels have to moor several hundred yards away from the pier. In rough sea weather, cargo and ships are exposed to hazards comparable to those at Ambrizete.

The persistent encouragement given by the authorities to Novo Redondo as a port and an administrative center, despite the mediocre qualifications of the site for both functions, originates in its historical significance in the occupation of Portuguese Africa. From this coastal foothold, which was established in 1769, periodic civilian and military attempts were made to penetrate the interior and subdue the resistance of native tribes. The last rebellion in the Seles area was put down only in 1917, when coffee growers already established inland could finally pursue cultivation with a feeling of security. In the meantime Novo Redondo had consolidated its position as a regional trading center and had become the capital of the Cuanza-Sul District in 1914. Porto Amboím had had a much more precarious historical existence under the name (until 1919) of Benguela-a-Velha.

Just before World War II, coffee traffic via the port did not exceed 1311 tons and the port's total trade stood at 4625 tons (Fig. 7). Nevertheless, the outlet was equipped in 1942–1943 with a metal jetty 201 yards long (Fig. 12). Subsequently, a Diesel crane, a tug, and a lighterage fleet of 300-ton capacity were provided. Until 1954, port operations were carried out by *Marques, Seixas, & Cia*, the leading local commercial firm. Thereafter the terminal was placed under the control of the Lobito Port Administration (a subbranch of Angola's government transport organization), the former operators continuing as lighterage contractors.

After a peak coffee handling in 1951 of about 10,000 tons, when the value of the port's trade rose to 267,106 contos (U. S. $9.5 million), coffee exports at Novo Redondo showed a fluctuating but steady decline to only 3594 tons in 1957; port trade value fell to one-third of the 1951 figure. This reflected decreasing yields through plant disease in some coffee plantations and an increase in motor haulage of the crop toward Luanda or Lobito. In 1958, coffee traffic showed some resurgence.

Even more than its rival, Porto Amboím, the terminal of Novo Redondo has constantly experienced difficulties in keeping contact with the backcountry, because of very poor road ties. The locality is naturally isolated from inland producing areas by a coastal belt of sterile, semi-desert land. Only the determination of the leading traders in the city has succeeded in keeping coffee flowing toward Novo Redondo. To consolidate the capital's links with other inland population centers of the district an extensive road construction program was launched by the local government in 1957–1958. It is noteworthy, however, that with the exception of coffee, all significant outbound overseas shipments originate in the immediate vicinity of the terminal. These are palm oil and kernels from a large estate belonging to C. A. D. A., on the outskirts of the town, and fish products from plants in Quicombo Bay, about five miles south. Ninety-nine per cent of the small overseas imports are from Portugal, wine being the leading commodity.

Novo Redondo's coastal trade is only about one-half as great as Porto Amboím's, owing to the competition of motor transport over the coastal road to Lobito where many of Novo Redondo's shopkeepers secure their supplies. Lately the in-movements by coasters have risen to over 4000 tons, as cement and asphalt were brought in

from Luanda and Lobito for town and road construction. Out-movements are practically nil.

The total gross registered tonnage of deep-sea shipping calling at Novo Redondo is also only one-half that at Porto Amboím. Most frequent visitors are again the Dutch. Scandinavian vessels call with some regularity. United States' shipping has never been important and, in 1957–1958, no American vessels called. Even the Portuguese have called there only about once every three weeks since 1955, while they visit Porto Amboím twice as often.

What will the future hold for the two ports, particularly in their relationship as competing regional ocean heads? Most certainly the unused and modernized port facilities of Porto Amboím, inclusive of the coffee-reconditioning capacity at the local *Junta do Café* plant, deserve a realistic re-appraisal of state expenditure on the region's transport network. The drastic solution of closing the port of Novo Redondo and letting its traffic accrue to Porto Amboím is difficult to implement. About two-thirds of the coffee volume handled at Novo Redondo originates in the estates and from inland purchases of *Marques, Seixas, & Cia*, and another third comes from the firm of *J. Cardoso Matos*. A relocation of their commercial headquarters to Porto Amboím would call for considerable investment in new buildings, an expense to which these concerns are naturally adverse. Existence of port facilities at Novo Redondo also aids the fisheries and C. A. D. A. Continued maintenance of that port, however, is obviously to the advantage of so few interests that the transfer to them of all financial burdens associated with it is logical, while governmental assistance is badly needed to rehabilitate the Gabela–Porto Amboím route.

The C. F. A., because of the unrewarding operation of its railway at 22,000–28,000 tons a year, has long been hoping to be relieved of its ownership by the Portuguese State. Whether a simple take-over is the remedy, or whether the present railroad should be replaced by road transport to Porto Amboím should be decided only after a thorough survey of the situation. Thus far no move has been made to extend the line to serve Angola's leading post-war settlement scheme for immigrant Portuguese farmers, *Colonato de Cela*,[22] for which Porto Amboím should be the natural ocean head. Neither the narrow gauge of C. F. A. nor the terrain difficulties are *ipso facto* an obstacle to a much higher density of traffic on the line. Witness the similar rail lines in the Union of South Africa and the Belgian Congo with traffic movements of 150,000–200,000 tons.

FIG. 12. The harbor area and the jetty of Novo Redondo, seen from the city heights.

[22] *Colonato de Cela*, aiming at 300 settler families, was started in 1953 with government funds. Thereafter its scope constantly expanded in number of immigrants, acreage, and conditions for land grants. Prohibition of African labor was originally a restrictive factor on production, but gradually the farmers acquired tractors and some imported hired help from Portugal. The first limited surpluses were shipped to Luanda (270 mi.) and Nova Lisboa. Gabela railhead has thus far handled only two or three shipments of maize because of the almost impassable road connections.

SUMMARY AND CONCLUSIONS

This study has examined the development of Angola's trade in *robusta* coffee, the characteristics of its cultivation north and south of the Cuanza River, and the coffee export traffic at the four secondary coffee outlets during the last decade. Other activities of the small terminals have also been noted.

All four ports are open roadsteads. To permit a more satisfactory handling of their seaborne trade, substantial improvements have recently been carried out at each of them with the hope of increasing traffic, concerned primarily with coffee. The benefits of an expanding coffee production in their hinterlands, however, have been reaped chiefly by Luanda (Fig. 7) the leading gateway to northern Angola.

Of the quartet, Porto Amboím handled during the quinquennium 1954–1958 the highest tonnage of coffee, and also had the largest and most diversified trade. Nevertheless, the port and its short rail feeder have been working very much below capacity, due in part to the competition of the second outlet south of the Cuanza, Novo Redondo. The two secondary ocean heads north of the Cuanza, Ambriz and Ambrizete, have similarly been rivals in bidding for that region's coffee output.

The deflection of national coffee flow from minor terminals to Luanda is likely to continue in the future. It may even be amplified by transport developments in progress. The maintenance of, or any increase in the level of, their coffee trade would seem, therefore, to depend primarily on an enlarged coffee production within their tributary areas.

The export goals of the *Junta do Café* were not long ago placed at about 150,000 tons of *robusta* and 10,000 tons of *arabica*. An improvement in coffee yields and expansion of coffee planting in the present leading coffee areas, or in the frontier areas, could doubtless raise the volume of *robusta* harvest very close to that figure. Prospects for *arabica* in central Angola, where it is now raised, are somewhat restricted by humidity and altitude. An interesting effort is being made to introduce *arabica* in the traditional *robusta*-growing regions.

The ecological limitations in regard to optimum production, the problem of manpower, and the frequent lack of sufficient capital among the small and medium-sized planters are all internal obstacles to the further development of coffee cultivation in Angola; yet they are not insuperable. The most important factor tending to retard the upward trend of Angolan coffee production is not internal, but external.

For a number of years the world consumption of coffee has not kept pace with increases in output, resulting in a considerable stockpiling in producing countries. This superabundance of coffee on the world markets caused a fall in the price listings of Latin-American *arabicas* from 58.1 cents per lb. (for "Santos 4 grade," ex-dock New York) to 39.3 cents per lb. during the first quarter of 1959. African *robustas* had a lesser fall for the same period, from 31 cents per lb. for "Ivory Coast current" to 28.8 cents.[23] Angola's Ambriz stood in 1959 at 32.7 cents per lb. The narrowing price margin between the *arabicas* and the *robustas*, moreover, has created serious sales difficulties for the former.

Following a first restrictive agreement on exports concluded in Mexico City in the fall of 1957, a second limiting agreement on export production was signed by 15 Latin-American coffee countries in September, 1958, in Wash-

[23] "Coffee: World Situation," U. N., F. A. O., *Monthly Bulletin of Economics and Agricultural Statistics*, Vol. VIII, No. 5, May 1959, pp. 11–13.

ington, D. C. The African producers endeavored then to abstain from participation in a quota regime, but finally joined at a third international meeting in October, 1959, again in Washington, D. C.[24] In accordance with the last agreement, Angola is to reduce the volume of its coffee exports to countries other than Portugal by about 10 per cent below the level of 1956, the best year.

Unfortunately for Angola, the limited market of metropolitan Portugal cannot relieve the shrinkage of coffee-export earnings in foreign markets. On the other hand, a cushioning effect may be obtained by proceeding rapidly with the long-contemplated manufacture of soluble coffee in Angola, for present restrictions apply only to the green coffee bean. A possible beneficial effect of the present tight market may be the incentive given to coffee farmers in Angola to improve further the quality of their *robustas* rather than continually of their *robustas* rather than continually pursue quantitative increases in production.

[24] "Major Coffee Countries Sign International Coffee Agreement," *Foreign Agriculture*, November, 1959, p. 21.

FOOD FOR TAHITI

Glenn Cunningham

Dr. Cunningham, Professor of Geography at Los Angeles City College, spent nearly two years in Polynesia.

TAHITI, or indeed the name of any South Sea island, is likely to bring to mind a picture of lush tropical growth, with food in such quantity that its procurement is never a problem. It may be something of a surprise, then, to learn that Tahiti imports several million dollars worth of food and beverage products annually, and that foodstuffs account for one-third of the value of all imports. Tahiti's food bill is greater than that for building materials, gasoline, metals and machinery, textiles, and other items for which the island must be entirely dependent on outside sources.

Nature *is* bountiful in Tahiti. The volcanic soil is productive; the growing season is year round, uninterrupted by cold or drought. The lagoon, the reef, and the sea abound in fish and shellfish of every kind.

Most of Tahiti's 400 square miles, however, are in rugged, uncleared mountains; the narrow coastal lowland, never more than 1000 yards in width, is only a small fraction of the total area. Potential agricultural land is limited.

Nevertheless the early visitors to the island described a large, and apparently well-fed population. The 30,000 living there today may actually be fewer than the numbers at the time of Captain Cook's visit, but there are significant differences now to account for present-day food requirements. One-half of the island people live in the city of Papeete and are largely non-producers of food. Five thousand of the total are Chinese, and nearly 2000 are French or other white, with demands for foreign products. Even the native today, no longer satisfied with the healthy diet of his ancestors, insists on bread, tea, sugar, canned goods, and many other items that he sees the white man eat.

Food sources today are three: the island of Tahiti, the other islands of French Polynesia, and imports from overseas. The island itself, of course, provides the largest share.

Tahiti's Contributions

More than four-fifths of Tahiti's cultivated lands are in coconuts that are only a minor source of food. They are grown principally for the production of copra, the island's money crop that is exchanged in the markets of the world for foreign products, food included. Vanilla, another money crop, likewise contributes little to the local food supply. In spite of the emphasis on copra, however, every native household in the village and country districts, and many of those in-town, grow their own supplies of the basic starch foods of the diet: taro, sweet potatoes, manioc, breadfruit, and bananas. In the mountains grow the wild bananas known as *fei*. Pigs, chickens, and ducks run in every yard. With these products, and the fish and shellfish found not far away, many Tahitian families could be

self-sufficient on the diet of the pre-European era.

Also widely grown on individual farmsteads and in city yards are various fruits—pineapple, oranges, limes, avocados, mangos, papaya, and watermelon—many of them introduced by the white man, but all now adding variety to the diet. Coffee, likewise the white man's introduction, grows abundantly in the country districts; much of it is semi-wild. It is gathered as it is needed, hulled in the village hulling machine, then roasted and ground in the home.

Commercial agriculture, other than the cultivation of the money crops, is limited. For the city population, a few of the products mentioned above are grown commercially in small quantities and usually in small, scattered plots. Among these are bananas, coffee, taro, and manioc. On the Agricultural Experiment Farm, grapefruit (pamplemousse) is grown commercially.[1]

Chinese farmers raise a great variety of middle latitude vegetables: green beans, sweet corn, tomatoes, and cucumbers of fair appearance; and scrawny specimens of cabbage, lettuce, and celery. In fact, almost every type is grown to some extent with the exception of onions and white potatoes which do not thrive in the islands. These vegetable plots are often on high mountain slopes, climatically better suited than the coastal lowlands, but so steep and inaccessible that only the Chinese would go to the trouble of cultivating them.

The leading food producing areas, in both subsistence and commercially grown crops, are the District of Arue, adjoining the city of Papeete, and those on the Isthmus blessed with the largest areas of flat, arable land, namely the Districts of Afaahiti-Taravao, Papeari, and Vairao.

Animal products are of minor importance, but the 8000 beef cattle and the two small dairy herds, one in Pirae near Papeete, and one in Taravao on the Isthmus, must be mentioned to complete the census of Tahiti's agriculture. Most of the cattle graze in the coconut groves, so little space need be devoted to pasture alone.

In an average recent year 2500 cattle and 4500 pigs were slaughtered in Papeete. Meat sales in the market are always much smaller than those of fish, but they rise a bit when the supplies of bonito fall off. At all times they are small; meat consumption on the island averages only 80 grams ($2\frac{2}{3}$ oz.) per capita per day.[2]

Milk consumption figures are equally unimpressive, averaging slightly over four quarts per capita per year.

Chickens are common; most of them are owned by native families and are of the scavenger type. Three larger scale producers of eggs who supply the stores, restaurants, and yachts, feed their laying hens imported grain, bran, and mash, or, if these are unavailable, coconut meal. During the summer when wild hens lay in the bush eggs are plentiful and cheap.

The important protein food, of course, is fish. No Tahitian family, with the exception of some of those in town, is without its *pirogue*, or canoe, with which to gather the resources of the lagoon. A fleet of a dozen small power launches brings in daily the supply of

[1] Agricultural statistics in Tahiti are largely in unpublished form, and are irregular and fragmentary. One agency, for example, will provide the information that exactly 539,049 coconut trees grow on the island, but none will hazard a guess as to the number of acres of garden vegetables. The following acreages, however, were estimated for 1953: bananas, 1200; coffee, 900; manioc, 250; sweet potatoes and yams, 125; pamplemousse, 100; taro, 70. *Recensement des Productions Agricoles de Tahiti* (1953) Unpublished.

[2] Unpublished data obtained from records of the Papeete Market.

deep-sea fish. Fish sold through the market, largely bonito from beyond the reef, reach a total of 90 tons a month when the runs are good during January, February, and March, falling to about a third as much in September and October.[3]

To round out Tahiti's local food picture, a few simple processing and manufacturing industries must be mentioned. In addition to the processing of the money crops for export, namely vanilla curing, and the preparation of copra and other non-food products of the coconut, several home grown products are processed for local use. Coconut oil is refined for use in cooking. Small outfits roast coffee and peanuts. Others bottle grapefruit juice, or manufacture guava jelly, poi, a soy sauce substitute, sausage, or soft cheese, all for distribution through Papeete's market.

Imported raw materials are the basis for still other industries. Scores of Chinese bakeries using imported wheat flour turn out the ubiquitous French bread, long loaves of which are seen under every shopper's arm, and in the country districts, sticking out of every mail box. Other pastries, candy, and syrup are made in small quantities. Ice cream is very popular. Six small bottling plants produce highly colored carbonated drinks, and Papeete's brewery, enlarged and modernized in 1955, has an annual capacity of a third of a million gallons. A by-product is ice.

FOOD FROM THE OTHER ISLANDS

Supplementing these resources of this single island are the imports, brought in by copra schooner, from the other islands of the Colony. Practically all are destined for the city market.

The low coral atolls of the Tuamotus are poor in most food resources and send only small shipments of dried fish. Nearly all of the other "high," or volcanic islands, however, have food surpluses; every returning schooner, even though from the distant Austral, Gambier, or Marquesas groups, will bring a few bags of arrowroot flour made from manioc, some fowl, a few squealing pigs, and sacks of green coffee. Much of the latter is for re-export, although Tahitians show a preference for Marquesan coffee. In addition to quantities of these products, the nearer islands, Moorea and the Leeward Islands—Huahine, Raiatea, and Tahaa—send taro, bananas, *fei*, watermelons, and other fruit. Cattle are shipped alive from several of the islands, but principally from Raiatea.[4]

Tahiti with the help of its neighbors, then, can be considered self-sufficient in the following: tropical fruits and starch products; fresh vegetables except for potatoes and onions; pork; poultry and eggs; fresh fish and shellfish; and coffee. Fresh fluid milk should be added if one considers the absence of imports as evidence of sufficient local supply.

One can think of other demanded products that might be grown locally, particularly rice and sugar. A little rice is grown and milled on near-by Moorea, and sugar has been grown on a small scale on Tahiti at times in the past. But the native of the Eastern Pacific islands is a notoriously poor field laborer, and plantation agriculture, especially the growing of sugar, has thrived only in such places as Hawaii and Fiji where Oriental labor has been introduced. French Polynesia's present Chinese population does date from attempts at the plantation growing of sugar and cotton in the nineteenth century, but the projects, poorly timed, were short-lived, and the Chinese soon turned to other pursuits.

[3] *Ibid.*

[4] Service de l'Agriculture, Papeete.

FOODSTUFFS FROM ABROAD

As suggested earlier Tahiti's population is no longer content with island products only but draws on foreign lands to fill its menu. In fact, in few places can one dine so well on such a variety of foods from far-flung sources as in Papeete where he has at his disposal excellent New Zealand steaks, frozen foods from America, fancy cheeses and wines from France, Chinese specialties, and canned and packaged goods from all the world.

The leading food imports, in the order of their annual values, are flour, sugar, canned meat, rice, and butter, these five accounting for 50 per cent of the total (Table I). None of these is exclusively, or even mainly, for the foreign population; all are in daily use by the Tahitians who can afford them. The same is true for some of the other leading imports such as canned milk, canned fish, and wine. The demands of the alien tastes are reflected in such items as fruit and vegetable products, baked goods, cheese, potatoes, and onions.

Sources of these products are widespread; all six continents contribute to Tahiti's food supply, although four countries—France, Australia, the United States, and New Zealand—provide over 60 per cent (Table II). This list of leading contributors occasions no surprise. France, the mother country, is a logical source. Australia and New Zealand are the closest areas with complementary climates and hence resources, while Tahiti's most frequent steamer service is with the United States.

Heading the list is France which provides, among other things, the bulk of the island's flour needs, this item alone constituting about 40 per cent of her total shipments. Other major items are confectionery, canned fish, baked goods, potatoes, cheese, and the bottled wines and other alcoholic beverages without which the French meal, even in Tahiti, is not complete. An enormous number of other products in smaller quantities arrive to satisfy the French nationals who preserve their cherished cuisine.

Australia's largest shipments are butter and condensed milk, and she is Tahiti's principal source for both, although canned meat, baked goods, cereals, and flour are important.

Although not equalling the total value of exports from Australia, the United States surpasses her in the variety—the total number of food items—that are shipped. Shelves and show windows in Papeete are crowded with familiar brands of breakfast foods, pork and beans, soups, and chewing gum. And now each store contains a freezer full of frozen fruits and vegetables.

TABLE I

FOOD AND BEVERAGE IMPORTS, 1958

	*Pacific francs (000)**
1. Flour	45,420
2. Sugar	41,723
3. Canned meat	27,293
4. Rice	22,375
5. Butter	19,850
6. Canned milk	19,254
7. Canned fish	17,132
8. Canned vegetables and fruit	16,157
9. Wine	14,124
10. Baked goods	10,206
11. Confectionery	9,242
12. Vegetable oils	8,847
13. Fresh vegetables and fruit	6,604
14. Cheese	5,903
15. Potatoes	5,714
16. Dried vegetables and fruit	4,371
17. Beer	4,225
18. Macaroni, etc.	3,767
19. Alcoholic beverages	3,669
20. Onions	2,448
21. Fresh and frozen meat	2,008
All others	25,479
Total	315,811

Source: Compiled from data in *Statistiques Douanières, Année Entière, 1958, Supplement au Journal Officiel de la Polynésie Française du 30 Avril 1959.*

*The Pacific franc, exchanging at 63 for $1.00 in 1958, was worth approximately $.016 (1,000,000 francs $16,000.00).

TABLE II

SOURCES AND VALUES OF TAHITI'S FOOD IMPORTS, 1958

	Pacific francs (000)
1. France	84,098
2. Australia	55,088
3. United States	36,626
4. New Zealand	21,300
5. Holland	16,913
6. Algeria	14,244
7. Viet Nam	13,023
8. Guadeloupe	12,186
9. Martinique	8,530
10. Madagascar	8,447
11. England	7,391
12. Hong Kong	6,728
13. Canada	4,081
14. Belgium	3,271
15. Chile	1,977
16. Germany	1,919
17. Switzerland	1,756
18. Morocco	1,654
19. Denmark	1,634
20. Cambodia	999
All others	13,946
Total	315,811

Source: Compiled from data in *Statistiques Douanières, Année Entière, 1958, Supplement au Journal Officiel de la Polynésie Française du 30 Avril 1959.*

Much of this taste for American foodstuffs and brands probably dates from World War II when Tahiti, cut off from France and the Antipodes, had as its only contact with the world an occasional freighter from California. Most of the products from this country are of California origin—canned fish, canned vegetables and fruit, dried fruit, canned milk, onions, and potatoes.

New Zealand's major contribution is canned bully beef. Two Auckland companies specialize in a cheap grade of canned corned beef packed especially for Pacific island trade and labeled in five of the island languages. "Puuatoro Numero Hoe" (First Class Beef) is included to catch the Tahitian eye. New Zealand's dairy industry provides her other major shipments, canned milk, cheese, and butter.

Next in importance are Holland, the leading source of imported beer, but also shipping a number of other products led by refined sugar and confectionery, and Algeria whose principal shipment is cheap wine sent in huge hogsheads.

Also among the first ten are Viet Nam and Madagascar, principal sources of rice; and Guadeloupe and Martinique which ship the raw sugar which the natives use in the unrefined state.

From Canada come canned salmon and flour. Hong Kong supplies the great variety of special foodstuffs demanded by Tahiti's Chinese. Chilean wine, English whisky, Belgian refined sugar, Cambodian rice, and Moroccan canned fish are all received in appreciable quantities.

Although the amounts are small, the importation of tea from Ceylon, vegetable oil from French West Africa, fresh fruit and vegetables from the Cook Islands, beer from Denmark and Germany, cheese from Switzerland, hops from Yugoslavia, flour from Czechoslovakia, and wine from Spain and Portugal add to the cosmopolitan nature of Tahiti's diet.[5]

In the last few years the list of the major sources of Tahiti's foods has undergone some significant changes, led by the increasing importance of France and French colonies. In 1952 Australia supplied nearly all of Tahiti's flour and thus was in first place.[6] France at that time was fourth, but currently is supplying flour, the colony's largest import, and now ranks first. France has also gained in her share of many other products at the expense of Australia, New Zealand, and the United States. Since 1952 the French West Indies have re-

[5] Dutch Guiana, Thailand, Burma, New Caledonia, New Hebrides, Cuba, Norway, Sweden, Fiji, Japan, and Hawaii have all contributed in recent years.

[6] From data in *Statistiques Douanières, Année Entière 1952, Supplement au Journal Officiel des Etablissements Française de l'Océanie du 15 Octobre 1953.*

placed Fiji as the major source of raw sugar.

Hong Kong now supplies the foodstuffs that were received from China before the Indo-Chinese War, and tea, also formerly from China, now comes from Ceylon.

DISTRIBUTION

These foreign import data, it should be remembered, are not for the single island of Tahiti, but represent the imports of the Colony. A few of the products trickle out to the remotest of the islands. Still, one-half of the population of French Polynesia is on Tahiti, and certainly more than one-half of the imports are consumed there.

Distribution of the island's food is effected through small general stores, nearly all Chinese-operated. There are dozens of them in Papeete handling all of the town's supplies of canned and packaged goods, the frozen foods, the imported fresh meat, and the imported onions and potatoes which sell out rapidly after each ship arrival. Each village store, with a similar but smaller stock, is also apt to be the local bakery.

Fresh produce, whose distribution is unnecessary in the country, is sold through a large central market for the benefit of urban folk. Sections of it specialize in fruits and vegetables, fresh meat, fresh fish, and baked goods. Neat piles of melons and eggplant, tomatoes and taro, and block-long racks of glistening fish, make the market quite a showplace.

Country shoppers, although independent of the market for most produce, must go there for three items: bonito and other deep-sea fish, all of which are landed at Papeete; beef, nearly all of which is butchered in or near town; and Chinese-grown vegetables, also marketed through this channel. The result is a picturesque bedlam for a few hours each morning as shoppers haggle over breadfruit and cabbage and squid, and the Sunday morning market especially is a must for every tourist.

FOOD EXPORTS

With the exception of vanilla, Tahiti has little food in surplus for export. Cured vanilla beans to the value of 163,913,000 Pacific Francs were shipped in 1958, one half to France, the balance to Germany, Australia, and the United States. Dessicated coconut, refined coconut oil, and green coffee were also sent to France. New Caledonia received small quantities of fresh vegetables, fruits, peanuts, confectionery, and beer.[7]

French and foreign flag vessels are often provisioned with fresh meat, fish, eggs, vegetables, fruit, and ice. Within the colony Tahitian bottled beer and soft drinks are shipped to all the other islands, while the nearer ones receive in addition ice and ice cream.

And thus Tahiti keeps fed. While the tourist enjoys a feast of native foods—taro, breadfruit, baked fish, and suckling pig; and the French or American or Chinese resident is dining on familiar foods from his homeland; the native Tahitian eats a meal of rice from Madagascar, French bread with butter from Australia, Ceylonese tea sweetened with sugar from Martinique, and, if he feels affluent, a can of bully beef from New Zealand or salmon from Canada, the whole washed down with generous drinks of Algerian red wine.

[7] From data in *Statistiques Douanières, Année Entière 1958, Supplement au Journal Officiel de la Polynésie Française du Avril 1959.*

HARRIS TWEED: A GROWING HIGHLAND INDUSTRY

H. A. Moisley

Mr. Moisley is a member of the staff of the Geography Department of the University of Glasgow. Since 1955 one of his main research interests has been the study of various aspects of crofting communities in the Outer Hebrides, which he has visited regularly several times each year.

THE Scottish woollen industry is but a small part of the woollen industry of Great Britain, and is by no means typical of it. The greater part of the British industry is concentrated in a small area of the West Riding of Yorkshire and produces a great variety of materials. The Scottish portion is dispersed throughout the country, with particular concentrations in the Borders, the Glasgow region, and the Hebrides, and is characterized by the high quality of its products. This quality has been achieved, and is maintained, by the use of selected raw materials and by the maintenance of high standards of design and craftsmanship. In particular, the Scottish industry depends on virgin wool; mungo, shoddy and other re-manufactured wools, such as are used extensively in the West Riding, are scarcely recognized. It is not surprising, therefore, that the products have become widely known at home and overseas, and that "Made in Scotland" is a mark which commands particular respect when attached to woollen goods.

The Hebridean section of the Scottish industry is no exception. But it is remarkable in several ways: in its extreme geographical concentration; in its dependence on a single product, "Harris Tweed," woven by self-employed weavers using treadle looms; and in its extremely rapid and very recent growth. There are about 1500 weavers in the Hebrides. Almost all are to be found in Lewis, most of them in certain districts; in South Uist there are about 80, and a few may be found in North Uist, Harris, and elsewhere. In addition about half a dozen carding, spinning, and finishing mills in Lewis, one in Harris, and one in North Uist employ about 1000. The industry has particular significance in Lewis where, in many townships, more than half the families have looms and where it has replaced fishing and fish curing as the economic mainstay of the population; tweed output increased more than sevenfold between 1912 and 1940, when it exceeded four million yards. In 1956 about seven million yards were made in Lewis, and less than 100,000 yards in Harris. Thus, despite its name, Harris Tweed is a peculiarly Lewis product. How has this geographical concentration come about, and is it likely to continue?

The Origin of "Harris" Tweed, 1844–1900

The manufacture of coarse woollen cloth in the Hebrides, as in other rural areas, is of long standing. Rents were sometimes paid in blankets or "plaid-

ing" and in 1656 "pladding" was one of the items of trade brought by the Highland boats to Glasgow.[1] In the late eighteenth century Black-face sheep were introduced into the Highlands. Their fleeces were much heavier than those of the native sheep and consequently provided raw material for local woollen manufacture for trade. In Argyll, for example, yarn was handspun and sold to dealers, and in Inverness and Sutherland carding and spinning mills were established. In Shetland the special quality of the native wool had long been recognized, and was responsible for the early success of hosiery manufacture. In the Outer Hebrides, however, little commercial development seems to have taken place at this time. The Black-face sheep, introduced there about 1762, was not at first successful; weaving seems to have been mainly for local use. In North Uist, the writer of The Old Statistical Account tells us, there were "no farms fit for sheep; but every tenant endeavors to rear as many as will furnish him with a little mutton and wool for clothing.[2] These were the small native Hebridean sheep, yielding less than a pound of fine short wool from each fleece. In 1808 Walker stressed the possibility of producing wool yarn, cloth, and blankets in the Outer Hebrides,[3] but so long as kelp remained an easy source of wealth for the proprietors, and of employment for the small tenants, there was little incentive to spin and weave for the market.

The people of Harris, however, were well known for the excellence of their weaving and in 1844 the proprietor, the Earl of Dunmore, had the Murray tartan copied in tweed by local weavers. This was so successful that he and his wife encouraged improvements and, besides using the tweed themselves and for their employees, they introduced it to their friends. No doubt the increasing popularity of the Highlands and Hebrides for sporting parties not only helped to make known the tweed, but also led to its use, for it was well suited for outdoor pursuits such as stalking and fishing; it was warm yet light and would "turn" moderate rain. About 1857 an Edinburgh lady began procuring orders for Harris weavers and when, in 1888, she removed to London she opened a small depot for tweeds. Similarly, in Skye and Uists, Lady Gordon Cathcart was buying tweed from local weavers and selling it to a firm in Jermyn Street, London.

Thus, partly for its utility and partly out of philanthropic motives, Hebridean tweed was becoming widely known by the seventies. Weavers and local "merchants" (usually shopkeepers) developed contacts in London and in many large towns. St. Kilda and Shetland tweeds also began to appear on the market. That from St. Kilda gained a particular reputation; 800–1000 yards were shipped by the annual steamer to Glasgow and were often sold even before they arrived. The industry was entirely domestic and very primitive; all processes were carried out by hand. Washing and dyeing were done out-of-doors beside any convenient stream where a black pot could be set up on stones and heated by peats. Carding, very tedious and rather unpleasant, spinning, and weaving were done in the cottages of the people which at that time were mostly "black houses" without chimneys or proper windows. Hence the tweed acquired an aroma of peat

[1] A. Macdonald and A. Macdonald, *The Clan Donald*, Vol. III, 1904, p. 666; also Thomas Tucker's report (1656), ". . . on the Revenues of the Excise and Customs in Scotland," published in the *Miscellany of the Scottish Burgh Records Society*, 1877, p. 26.

[2] A. MacQueen, *Parish of North Uist*, in *The Old Statistical Account*, Vol. 13, 1794, p. 307.

[3] J. Walker, *An Economical History of the Hebrides*, Vol. II, 1888, pp. 340–341.

smoke which was considered to be one of its attractions.[4]

Only in Lewis was commercial weaving slow to develop; here a good deal of employment was provided by the building of shooting lodges, roads, and other public works financed by the new proprietor, Sir James Matheson, who had bought the island in 1844. Later, in the sixties and seventies fishing was relatively prosperous, too, and this may have reduced the incentive to weave for sale. A few Lewis merchants were dealing in tweeds at this time but there are very few records of commercial production in Lewis until after 1880; it may be no coincidence that about this time, following the death of Sir James, the proprietors greatly curtailed expenditures. About this time, too, fish sales by auction replaced private contracts between fishermen and curers. As a result, fishing became far less remunerative to the many crofters who worked as hired hands.[5]

In the latter years of the nineteenth century, as a result of competition from small local mills, domestic spinning and weaving declined and almost disappeared in the mainland Highlands; but in the Hebrides, encouraged by the proprietors, by local shopkeepers, and by non-profit-making groups such as "Scottish Home Industries Association" and "The Crofters' Agency," it grew and prospered. By this time the Blackface sheep was well established and with it a greatly increased annual clip of raw wool. But the cost of freight made sale of fleeces less attractive than domestic spinning, particularly to crofting families, each with only a few fleeces but with plenty of time on their hands. In addition there was the growing recognition of the particular value of tweed for "country" use, and an increasing fashion for handicraft products—a reaction against the uniformity of machine-made goods. At that time every web of tweed was unique and could never be exactly reproduced. The "glamour of homespun," the association with the Hebrides, the thatched cottage, the peat fire, the natural dyes of moor and shore—all contributed to the vogue for tweed, which became known by the name of its principal, but by no means sole source, Harris.

THE FIRST BOOM, AND THE RISE OF LEWIS TWEED, 1900–1920

Increasing demand brought its own problems. Carding by hand was very slow and demand for yarn was growing year by year. Consequently, the practice grew up of sending wool to mainland mills for carding. Once this began it opened the way to mill-spinning, to the use of mainland or overseas wool and even, it was suspected, of shoddy, thus debasing the original product on which the reputation had been gained. To avoid this, in 1900, Sir Samuel Scott, the proprietor, opened a water-powered carding mill at Tarbert, Harris. His example was followed, in 1903, in Lewis by a Stornoway merchant, Aeneas Mackenzie, who started a carding mill at the Patent Slip. As demand grew, the non-profit-making groups, still partly philanthropic in their inspiration, opened more depots: to the original ones in Tarbert, Harris and Stornoway were added others at Obbe, South Harris (now called Leverburgh); Uig, Lewis; and in North and South Uist (Fig. 1). The Congested Districts Board ap-

[4] *Home Industries in the Highlands and Islands* (Cd. 7564, 1914, pp. 70–77). This report, compiled by W. R. Scott for the Board of Agriculture for Scotland, is the chief published source for material relating to the period up to 1912.

[5] The Parliamentary *Report . . . on the Condition of the Cottar Population in the Lews* (C. 5265, 1888), and the special report by the Crofters Commission on the *Social Condition of the People of Lewis in 1901* (Cd. 1327, 1902), both include references to the difficulties of crofter-fishermen in the 1880's.

FIG. 1. Location diagram, showing also the tweed depots of the non-profit-making agencies c. 1906, i.e., at the end of the first phase of the development of the industry.

pointed a traveling instructor who was responsible for the introduction of better designs and other improvements, including the flying shuttle, for on the "Beart Bheag" (traditional small wooden loom) the shuttle, a sheep's shin bone, was thrown by hand. The Board paid grants for improved looms and large black iron pots were sent to Uig, Lewis, to enable the people there to dye larger batches of wool and so to maintain uniformity of color in a whole web.

It was Lewis, at this time, that seized the opportunity offered by increased demand, a demand that could no longer be met by the Harris spinners and weavers, even though the carding mill relieved them of the most time-consuming process. In 1899 only 55 Lewis looms were reported to the Congested Districts Board; by 1906 there were 161 and, by 1911, almost 300.[6] Not only in Lewis was the opportunity seized; in London, in 1906, a person was con-

[6] Annual Reports of the Congested Districts Board, 1899–1911.

victed for selling as "Harris Tweed" a cloth woven on a power loom.[7] As the weavers multiplied, so the demand for yarn outstripped the capacity of the domestic spinning wheels; cheap mill-spun yarn from the mainland was a serious temptation to poor weavers working on their own account, added to which the increased demand was partly met by inferior weaving. In the London wholesale trade the term "Stornoway tweed" came into use for a time to describe poor quality cloth, and in 1907 the Scottish Home Industries Association closed its Lewis depot because the amount of hand-spun yarn used did not justify its continuance. The Crofters' Agency, however, maintained its depot at Balallan, Lewis, to serve the Balallan and Park districts which, with Uig, were then the main weaving districts of Lewis. Thus at this time a division began to appear in the industry between 100 per cent true hand-spun tweed and tweed made partly, or wholly, of mill-spun yarn. In Stornoway it was appreciated that the use of mill-spun yarn did not necessarily result in a poor quality cloth; spinning machinery was added to the Patent Slip carding mill and, in 1906, another merchant, K. Mackenzie, began a second carding and spinning mill.

A new type of economic organization began to emerge, too. Originally tweed manufacture was strictly domestic, the wool of the crofter's own sheep was dyed, carded, and spun at home. The weaving, however, was often carried out by persons particularly known for their skill, usually on a non-monetary commission basis, e.g., in exchange for peats, potatoes, or labor, and the "waulking" (finishing) was often a communal operation for the women, and something of a social occasion. If the crofter had no means of selling the web himself, the local shopkeeper—the "merchant"—would buy or give credit for it. Soon some crofters began to buy raw wool along with dyestuffs, etc., and the merchant might advance these on credit to be deducted later from the price of the tweed. Under this system, particularly in Harris, weaving was a part-time, and mainly female, occupation.

With the rise of weaving for the market in Lewis, all this was changed. Weaving became a full-time specialist occupation and, perhaps partly because the flying shuttle made the work heavier, it became predominantly men's work. (There is some evidence that weaving was traditionally men's work in Lewis but women's work on other islands.) And with the use of mill-spun yarn there grew up, inevitably, a number of merchants who bought yarn either locally or from the mainland, wound it and put it out for weaving and hand finishing on a commission basis; yarn and resulting tweed remained the property of the merchants. These were the Lewis "producers"; sometimes hand-spun weft was used and sometimes no hand-spun at all; the cloth was marketed as Harris Tweed as was the 100 per cent hand-spun, yet it cost about 1/9 a yard to produce, as against 2/9 to 3/—.[8]

It was the type of tweed that provided the rapidly expanding output of Lewis between 1900 and 1911 and by the latter date (Table I) Lewis had outstripped Harris.

THE DEFINITION OF "HARRIS" TWEED AND THE CONCENTRATION OF MANUFACTURE IN LEWIS AND HARRIS

Even in Harris the boom led to the use of some mill-spun yarn and, in order

[7] Cd. 7564, 1914 (W. R. Scott's report), p. 48.

[8] Cd. 7564, 1914 (W. R. Scott's report), p. 61 and Appendix XXI, pp. 187–189.

TABLE I

PRODUCTION AND VALUE OF TWEED, ABOUT 1912

District	*Value £*	*Yardage*	
		(1) 100% hand-spun	*(2) Partly and wholly mill-spun*
Harris	26,500	175,000	4,000
Lewis	44,000	10,000	340,000
North Uist	6,600	46,000	"a little"
South Uist	900	6,500	?
Barra	.....	Negligible	.....
Total	£78,000	237,500	344,000

Sources: Reports to the Congested Districts Board and Board of Agriculture.

to protect the reputation of the hand-spun tweed, the Harris merchants began to demand a declaration from the weavers. That such a declaration was necessary may indicate how difficult it was to distinguish 100 per cent hand-spun from tweed which had only a hand-spun weft, commonly called "50–50 cloth," but such was the reputation of genuine Harris hand-spun that, in 1910, when mill-spun Lewis tweed was selling retail at 3/– to 3/6 a yard, the best hand-spun could fetch 6/6 to 7/6.[9]

The Harris merchants were concerned not only to maintain quality but also to retain the true handicraft nature of the industry, realizing that there was always a market for a distinctive craft product. As early as c. 1890 Mr. R. F. Matheson, Factor for the North Harris estate, had suggested that the Harris merchants should obtain a trade-mark,[10] but no steps were taken until 1906. The first application was from Harris only, but the Board of Trade insisted on Lewis, the Uists, and Barra being included in the definition of origin of Harris Tweed. In 1909, therefore, application was made for a trade-mark, for which purpose Harris Tweed was defined as "tweed, hand-spun, hand-woven and dyed and finished by hand in the Outer Hebrides, with "made in Harris," "made in Lewis," or "made in Uist," etc., added as appropriate. This was duly approved by the Board of Trade and the Harris merchants joined forces with their former rivals in the tweed-marketing business, the voluntary, non-profit-making associations. To inspect the cloth and stamp it with the trade-mark—an orb surrounded by a cross—they formed the Harris Tweed Association, consisting of two representatives each of the Harris merchants, the Crofters' Agency and the Scottish Home Industries Association.

Cloth was first stamped in 1911 and in 1912 some Stornoway tweed merchants asked for and were granted, representation. Two additional members were then appointed by the Lewis Harris Tweed Association. Production at this period is shown in Table I and Figure 2; only 100 per cent hand-spun qualified for the stamp, and it can be seen that, from the beginning, less than half the tweed produced in the Outer Islands was entitled to the new trade-mark.

The table and Figure 2 also show the

[9] Cd. 7564, 1914 (W. R. Scott's report), p. 73, quoting the manager of the Crofter's Agency, Tarbert, Harris.

[10] D. M. Morrison, Tarbert, Harris; letter published in the *Stornoway Gazette*, November 30, 1951.

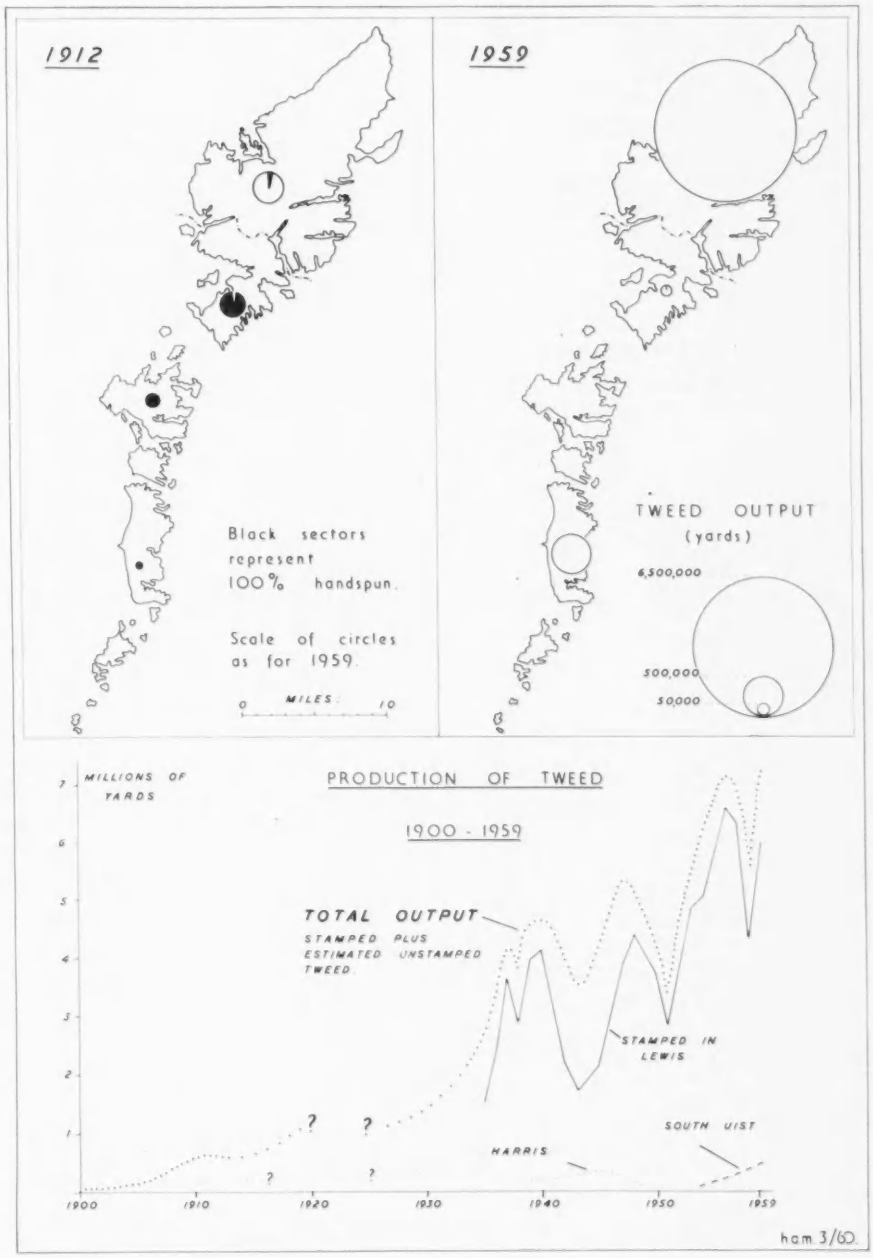


FIG. 2. Changing output and location of tweed production, 1900–1959. Note that the graph of tweed "stamped in Lewis" is based on figures supplied by the Harris Tweed Association; other figures are estimates, based on unpublished information.

extent to which the industry had become located in Lewis and Harris. Geographically the industry was even more concentrated; in Lewis it was mainly in Lochs and south Uig and in Harris in the eastern bays. The use of bought-in wool, and of carding and spinning mills, placed workers in outlying parts at a serious disadvantage, particularly those in Barra, the Uists, and Benbecula, who had to pay freight to and from Tarbert and Stornoway. Carding mills were proposed for North Uist and south Uig, but nothing was done and, after the first World War, weaving practically died out in all the southern islands.

GEOGRAPHICAL CONCENTRATION IN LEWIS, 1920–1960

Overproduction of inferior tweed in Lewis in the years before the first World War had its inevitable effects. In 1913 the wholesale price of Lewis tweeds fell to 1/6 or 1/9 a yard and it seemed inevitable that the mills would be forced to introduce power looms in order to maintain a good standard of weaving for mill-spun yarn, and so to protect themselves. This had already proved a fatal process in the mainland Highlands where several small spinning and weaving mills, themselves once responsible for the decline of local hand-spinning and weaving, had subsequently succumbed to competition from the south. What was more, the bad name which had been earned by inferior Lewis tweed seemed likely to affect the original Harris industry. "The masquerading of Lewis tweed as Harris tweed has already gone on far too long," wrote the reporter to the Board of Agriculture in 1913,[11] and he went on to urge the improvement of the Lewis tweed, and its marketing "for what it is, not represented as Harris tweed."[12] There was no doubt that a really good tweed could be made from wholly mill-spun yarn. Given good material and workmanship such a cloth could command a reasonable price as compared with the more expensive 100 per cent hand-spun, which was still the main product of Harris as well as of a minority of Lewis weavers.

It was fortunate that in Lewis the organization of much of the tweed industry had come into the hands of "producers" who were able to insist on quality production. To their great credit, and that of the weavers, the standard of the mill-spun tweed was greatly improved, but the name "Harris Tweed" was so firmly entrenched in the public mind that it was impossible to eradicate it, despite the restriction of the orb trade-mark to 100 per cent hand-spun. After 1919, expansion of the industry in Lewis was resumed, aided by the extensive and elaborate advertising of certain producers, notably Newalls. The Newall family came to Lewis from Yorkshire as farmers in the middle nineteenth century. They also had a butcher's business in Stornoway where they began to accept tweeds in lieu of cash; thus they became dealers in tweed. After their farm at Aignish, near Stornoway, was broken up to form crofts, about 1906, they began to buy yarn and put it out for commission weaving. About 1918 they bought the Patent Slip mill which they subsequently greatly expanded. Other producers also extended their trade at this time, obtaining some weft yarn from domestic spinning wheels but most from the two Stornoway mills and some from the mainland. As time went on it became clear that hand-spun yarn could never be produced in the quantities required by the now rapidly expanding industry.

This expansion was made possible by

[11] Cd. 7564, 1914 (W. R. Scott's report), p. 64.

[12] Cd. 7564, 1914 (W. R. Scott's report), p. 64.

the decline of fishing, particularly of herring fishing. Weaving was taken up extensively in townships where it had not previously been important; many of the townships affected were those where, before 1914, there had been a great annual exodus to follow the herring fishing round the coast to East Anglia and the English Channel. Partly in their own boats, but mainly as hired hands, many men had thus made the greater part of their annual income. More than 2000 women too, once "followed the herring" each season, gutting and packing. But after 1919 this industry suffered a disastrous decline and many Lewis families suffered. Thus, and encouraged by enterprising local residents acting as producers, i.e., buying yarn and putting it out for weaving, the Shawbost district on the west coast became one of the chief centers, rivalling and eventually exceeding Lochs and Uig. Looms were provided by local and Stornoway producers, being paid for by deductions from the weaver's commission. This growth was accompanied in Lewis by the introduction of the Hattersley treadle loom which was much quicker, and capable of more complicated patterns, than the wooden loom.

Although some producers were buying crofters' own tweeds, a practice which only died out in Lewis in the 'thirties, most of the expanding output between 1920 and 1934 was by commission weaving of producers' own yarn. Also, while a good deal of domestic hand finishing still continued, tweeds were also being sent to the mainland, especially to the Paisley area, for finishing. Thus the Lewis industry became economically and technically organized to a higher degree than that of Harris, where the only change was the increasing proportion of "50–50" tweed, consisting of hand-spun weft and mill-spun warp. Spinning machinery was added to the Tarbert mill, and a second small mill was started at Geocrab in the east bays of south Harris. Meanwhile, in Stornoway, a third carding and spinning mill was built, financed largely by an Edinburgh firm.

The use of mill-spun yarn, even for the warp only, did not conform to the definition of "Harris Tweed" required by the 1911 "Orb" trade-mark, but neither did the increasing output of Lewis tweed, much of which was 100 per cent mill-spun. By the late 1920's it was clear that the "Orb" trade-mark, restricted as it was to 100 per cent hand-spun, was out-dated. Increasing use of mainland—even Yorkshire—yarn, and of mainland finishing mills, seemed likely to so reduce the Hebridean associations of the product as to damage its reputation and open the door to mainland imitations. Great play was still made, in advertising, of cottage craftsmanship and the Hebridean environment. Many Stornoway producers had opposed, in 1910, the original move by certain Lewis merchants to join the Harris Tweed Association because it seemed likely to restrict production to a relatively small quantity at an unnecessarily high cost. The justification of this attitude was now obvious and in 1934 their definition of "Harris Tweed" was eased to permit stamping of any cloth "made from pure virgin wool, produced in Scotland, spun dyed and finished in the Outer Hebrides and hand-woven by the Islanders at their own homes in the Islands of Lewis, Harris, Uist, Barra and their several purtenances and all known as the Outer Hebrides." It was further provided that "Woven in Harris," "Woven in Lewis," etc., could be added, and also "Hand-spun" in the case of tweeds made *entirely* from hand-spun yarns.

The renewed Harris Tweed Association embarked on a world-wide ad-

vertising campaign and a period of rapid expansion and great prosperity ensued, particularly for Lewis mill-spun tweed. In 1935, one and one-half million yards were stamped, increasing to four million in 1940, almost all being from Lewis. One mainland firm moved spinning machinery to Stornoway in order to qualify for the mark, and, since mainland finishing disqualified for the "Orb" stamp, and domestic finishing could not cope with the increased output, finishing plants were added to the Stornoway mills.

The change caused much disquiet in Harris, where hand-spun yarn made on spinning wheels continued in use, associated with weaving on the old type of wooden hand-looms and, occasionally, with hand-finishing. The cost of production was inevitably much greater than that of tweed made wholly from mill-spun yarn and mill finished. The hand-looms were slower, too, and could not give such a variety of pattern. While a unique cloth could be produced it had to command a high price to justify the time spent on it and, consequently, the main product of Harris became "50–50" cloth, finished at the mills.[13] A general shortage of cloth gave the individual weavers, both in Harris and Lewis, a final burst of prosperity during the second World War, but this was unfortunately accompanied by some bad weaving and occasional use of mainland spun yarn of dubious origin. In 1947, to help the Harris weavers, a special cachet indicating the use of hand-spun weft, was introduced and in 1960 one mill made arrangements to card wool for hand spinners. The reluctance of the mills to continue carding for hand spinners has led in recent years to the virtual abandonment of the spinning wheel in Harris, as it had been abandoned 20 or 30 years earlier in Lewis. At the end of the war about 200 looms were at work in Harris (compare 1000 or more in Lewis) but the imposition of a high rate of purchase tax and other marketing difficulties discouraged many Harris weavers.

"Producers" in the Lewis sense have not been a feature of the Harris industry nor are the Stornoway mills and "small" (i.e., non-mill) producers keen to send weaving so far afield when they can get it done in Lewis; thus Harris weaving has lacked an essential element of organization. Only a handful of Harris men work as full-time weavers for Stornoway producers; these are all near the Lewis boundary and have their own vans. Thus they are in a better position than most to assure quick return of tweeds. The custom of spare-time weaving by women is not conducive to the rapid and regular return of webs, which the manufacturers must have if their orders are to be promptly fulfilled.

A few Harris families maintain the old tradition, hand-dyeing and carding, spinning on the wheel, hand weaving and finishing. They produce a high-quality article, often to special orders for individual customers, and their tweeds command two or three times the price of the general run of tweed. In addition, there are in Harris the last traces of true domestic industry; in a number of households the annual wool clip, and that of the neighbors perhaps, is washed and dyed, carded, spun, and woven, mainly for domestic use. Some send wool to the mills for carding, some buy yarn, and many send tweed to the mills for finishing. The tweed may be offered for casual sale or may be used for the household. Blankets may also be woven. In such cases two or three or at most a

[13] See, for example, *The Highlands and Islands of Scotland, a Review of the Economic Condition with Recommendations for Improvement* (Scottish Economic Committee, 1938), pp. 123–124.

dozen tweeds may be made in a year, whereas the average Lewis weaver makes 50 or 60. By 1952 all but about a dozen in Harris had ceased regular weaving and output of stamped tweed had fallen to little more than 20,000 yards (c.f. 4–5 million yards in Lewis). Although the yardage stamped in Harris has increased a little in recent years, Lewis is now undoubtedly established as the main source of Harris Tweed.

THE HARRIS TWEED INDUSTRY TODAY

The geographer may well enquire not only why "*Harris* Tweed" is made in *Lewis* but why it is hand-woven in the Hebrides at all, when there is no technical reason why a similar cloth should not be made more cheaply on power looms on the mainland of Scotland, in Yorkshire, in America, or elsewhere. Since 1900 all the processes of manufacture, except weaving, have been mechanized. "Harris Tweed" is no longer the domestic product of cottage craftsmen; its manufacture is a well-organized industry using self-employed out-workers, paid on a commission basis, for the critical stage of production. If we analyze the wholesale price of a tweed we find that less than 15 per cent is attributable to the hand-weaving process. On the other hand by far the greater part of the output is made for island producers and all the mill processes of "Orb" stamped tweed (carding, dyeing, spinning, and finishing) are carried out in the islands. Thus the association with the Hebrides, and with individual craftsmanship, has been maintained while costs of production have been kept down to a level which has permitted a tremendous increase in sales. A skillful balance has been struck between a true domestic craft product, selling in limited quantities at a high price, and a mass-produced article; the resulting expansion of production has been the economic salvation of the island of Lewis.

There are about 1400 weavers in Lewis. Many of them are crofters, but the average Lewis croft is so small, supporting no more than a cow and perhaps a dozen sheep and their offspring, that a regular source of income is essential. In this respect Lewis differs from many other crofting districts, where crofts are larger though still not large enough. The majority of Lewis weavers and their families depend on weaving for their livelihood; they are full-time weavers and spare-time agriculturalists. Work as a self-employed weaver is well suited not only to the management of a small croft but also to the Hebridean temperament; weaving is tedious and arduous and when yarn is received from a producer the weaver may work long hours in order to complete the tweed quickly and so be ready for another. Most try to average two tweeds a week. But the weaver is self-employed, his own master, not tied to the tyranny of a factory clock. If the mood and the weather suits he can take a day to look to his sheep, to cut peats, or to cultivate his croft, and he will be prepared to work at the loom most of the night to make up for it if need be. The commission on weaving an average tweed (about 96 yards) is about £6; this is for two shuttles and a weft of 18 shots per inch; for more shuttles, or more shots per inch, higher rates are paid. Out of this payment the weaver has to allow for depreciation of his loom (his own property) and shed, and has to buy his own loom materials and pay for heating, lighting, and insurance. In addition, about 1000 men and women are employed in the mills and producer's warehouses and offices, mostly in Stornoway; these are wage-earning employees and while some of them are crofters, many

are not. Their average annual earnings appear to be greater than those of most weavers, but, despite a five-day week, they do not share the weaver's freedom. Such of them as have crofts are often hard put to it to cultivate and grow crops sufficient to winter a cow; wives and older children play a useful part here.

This total of 2400 Lewis people engaged in the tweed industry may be compared with about 200 regularly employed in fishing and fish-curing—a number which has declined catastrophically since 1914 and considerably even since 1949. There can be no doubt that, were it not for the expanding tweed industry, most of these 2400, many of them with their families, would by now have emigrated to the mainland or overseas. As it is, they have been able to stay in Lewis where they earn at least a million pounds annually in wages and commission.

This is not all. The organization of the industry is such that it still belongs mainly to Lewis, the profits accruing to Lewis men. The approximate proportion of tweed woven for the various types of producer is as follows:

Woven in Lewis		
(a) For Lewis mill-producers	56%	Using island-spun yarn.
(b) For Lewis "small" producers	28%	
(c) For Lewis "small" producers	2%	Using mainland yarn.
(d) For mainland producers	7%	
Woven in other islands		
For mainland producers	7%	Using mainland yarn.

Thus the greater part of the output is now woven on behalf of the Lewis mills, at least two-thirds of which, by capacity, are Lewis owned. These mills buy almost a third of the Scottish wool clip (although, by a curious anomaly, much of the Hebridean clip is shipped to the mainland, being more suitable for carpet manufacture). The mills obtained their large proportion of the total output in the period of rapid expansion, between 1934 and 1940; since then apart from the war years, the number of small producers has tended on the whole to decline, though more slowly than their declining share of the total output. The "small" producers are almost all domiciled in Lewis; many of them started as weavers and the distinction between weavers and the smallest of "small" producers is not clear-cut. When trade booms some weavers are tempted to try to make additional profits by buying yarn for themselves and their friends to weave. On the other hand the largest of the "small" producers are comparable in output with the smaller mills and some of them are now installing spinning and finishing plants.

THE DISTRIBUTION OF WEAVING

Weaving is not equally distributed throughout Lewis. In the first place some districts have far more weavers per capita than others (Fig. 3), and in the second place neither mills nor small producers distribute weaving evenly. Before 1920 weaving was mainly carried on in the two southern parishes of Lochs and Uig, but in the twenties Shawbost became an important center, due partly to the efforts of enterprising local producers. From Shawbost, before 1940, weaving was spreading to Carloway and the townships beside East Loch Roag, both local "small" producers and Stornoway producers, including the mills, playing a part. Little development took place in the north of Lewis—the Ness district—until after 1945; here the outlook of the people has always been seawards, to fishing and, latterly, the Merchant Navy.

Today, there are looms in every township and, in many, at least half the households contain one or two weavers (Fig. 3). Tolsta, Park, the Stornoway district, and Point provide exceptions; in each

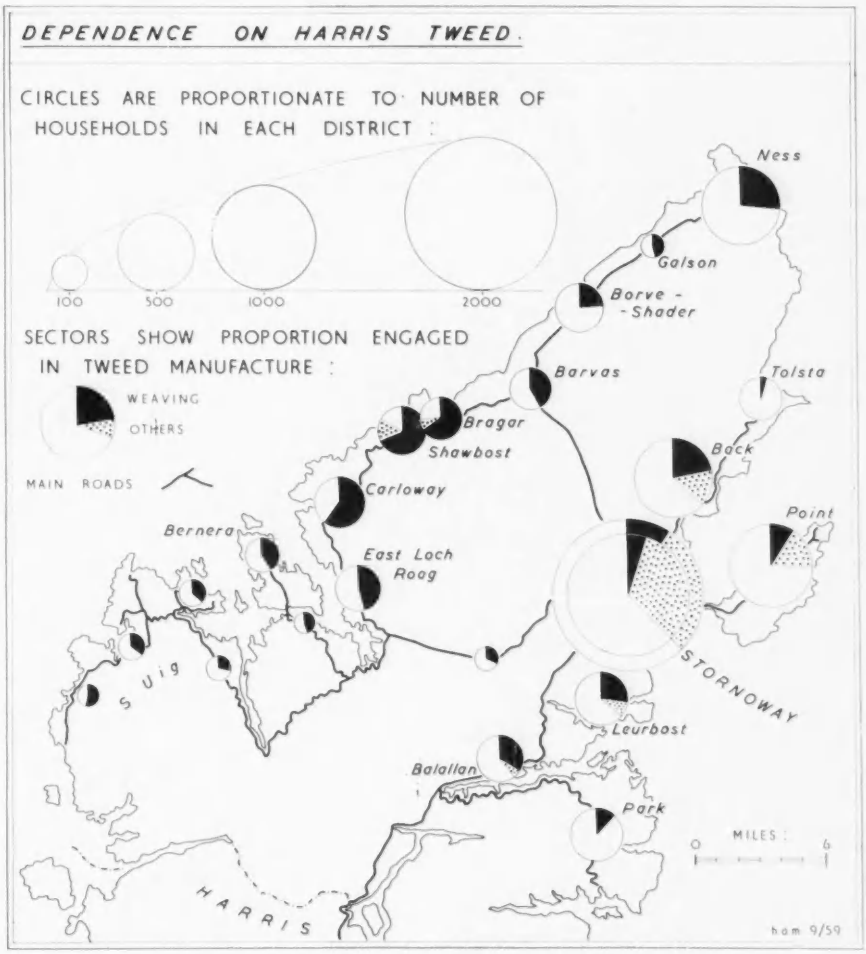


FIG. 3. Dependence on Harris Tweed. The symbols have been constructed as follows:
(a) The numbers of households were estimated by inspection of the electoral register.
(b) The numbers employed in weaving, etc., were estimated on the basis of data obtained privately, district by district.
(c) The symbol for Stornoway includes the Burgh (inner circle) and suburbs (outer ring).
Note that the symbols may slightly exaggerate the dependence on weaving, etc., because of occasional cases where there is more than one worker in a single household. The likely error does not exceed 5 per cent.

of these areas less than 15 per cent of the households have weavers. In the case of Park, the long and rather indifferent road may have deterred Lewis producers from distributing yarn, but mainland yarn is now woven. Tolsta is nearer to Stornoway than Shawbost, so inaccessibility cannot be the explanation; here as in Ness fishing and the Merchant Navy still claim many men. Point is in quite a different category: even the farthest township is but a

few miles from Stornoway, and a large number of men and women travel daily to work in the mills. Stornoway itself has relatively few weavers. Even though the Harris tweed weaver does not *have* to be a crofter (and some are not) the possession of a croft has several advantages; it provides a site or a convenient old house or byre, for example, where the loom can be installed and, more important, a subsistence base (albeit a very bare one) from which the very variable supply of weaving can be carried out. Few Stornoway houses possess premises suitable for a loom and some Stornoway weavers are obliged to use sheds some distance from their houses. Although there has been some tendency for weavers to immigrate into the Stornoway district from more remote areas, in the hope of obtaining more work, weaving in this area has to compete with mill work, which is more regular and may be financially more rewarding.

The distribution of weaving by mills and small producers presents a difficult problem, and certain districts complain that they are neglected. This may to some extent be inevitable. Tweed orders are often urgent and producers cannot afford to be constantly sending vans to remote areas; thus the Stornoway district, including Back and Point, and the townships on the circular route from Stornoway by East Loch Roag to Carloway, Shawbost, and Barvas, have a natural advantage over other places (see Figure 3). The mills, however, do appear to try to maintain an even distribution. Although over the whole island they are responsible for only two-thirds of the output, they supply up to 90 per cent of the weaving in Bernera and South Uig, for example. It is understandable that small producers, whose profit margins are less because they have to depend on the mills for yarn and finishing, are unwilling to incur extra transport costs, and it is fortunate for the west coast that several such producers are resident in Shawbost.

The average annual earnings of weavers have been £300–£400 in recent years, but in the more favored districts the average may be £500–£600 and the maximum at least half as much again. The mills and small producers have lists of weavers and in general distribute weaving in rotation. However, many weavers are on more than one list, and, apart from the advantages of living in one of the more accessible townships, certain weavers are well known for the excellence of their work and for their ability to produce complicated patterns; this, and a reputation for prompt return of webs, brings more work to some than to others. There appears to be more than sufficient weavers available to fulfil present demands and for this reason it seems unlikely that Harris will ever regain an important position as a center of weaving. The Tarbert carding mill has long had spinning machinery, but this belongs to a Stornoway firm and almost all the yarn is sent to Lewis. It seems unfortunate that the industry should have so declined in Harris, the island whence it got its name, but the small population of Harris alone could never have sustained it on the present scale. A market for genuine "homespun" tweed, either 100 per cent handspun or "50–50," could almost certainly be found, since it is now well known and generally accepted that the usual "Harris Tweed" is mill-spun. Carding facilities would have to be provided and some sort of organization set up in Harris but, above all, spinners and weavers enough to execute orders promptly would be required and it is by no means certain that they could now be found.

The experience of a new spinning mill

in North Uist is relevant in this respect. During the war there had been some signs of renewed interest in weaving in the island and, in the hope of encouraging this, the proprietors, Hamilton Estates, established a spinning mill about 1947. But weaving was not taken up locally to any extent and, while the mill is still in operation, much of the yarn is shipped to Lewis. Most of the crofts in North Uist are far larger than those in Lewis. Indeed, if well worked, many are capable of producing a reasonable living without resort to any full-time ancilliary occupation. This, and the absence of leadership in the form of local resident "small producers" who played such a large part in the development of weaving in Lewis, may explain the situation.

On the other hand about 1950 a mainland mill began sending treadle looms to South Uist. Some were installed in a weaving shed and others let out to crofters who undertook to perform a minimum amount of weaving. Unlike the Lewis weavers these men do not own the looms on which they work. The webs are returned to the mainland for finishing and the cloth is marketed as "Harris tweed" although not entitled to be stamped with the "Orb" trade-mark. The scheme was taken up, particularly in certain districts where the crofts are poorer than average, and in 1959 more than 100 weavers were at work. No figures of output are available but, if the weavers are working at the same average rate as those in Lewis, 500,000 yards per annum may be produced.

WEAVING OF MAINLAND YARN: IS IT HARRIS TWEED?

The plentiful supply of weavers in recent years has made it possible for a number of mainland mills to send increasing quantities of yarn to Lewis for commission weaving (*vide supra*, p. 16). Their product thus gets the status of a hand-woven article, is sold as "Harris tweed," and gets considerable benefit from the reputation built up by the Lewis industry since 1920. This type of tweed is not entitled to the "Orb" stamp. Until recently, there was no guarantee that the yarn was necessarily of Scottish wool. However, when the firms concerned applied to Lord Lyon King of Arms for a grant of arms, to use in lieu of a trade-mark, that official insisted that the arms could only be used with reference to a purely Scottish product. Nevertheless, neither the arms granted by Lord Lyon, nor a similar trade-mark for which application has been made to the Board of Trade, will be used in a manner comparable with the well-known "Orb" trade-mark in use since 1911.

The latter is the property of, and applied by, an independent non-profit-making body, the Harris Tweed Association. Before stamping any tweed presented to it the Association requires a signed statement from the owner declaring "that the Tweed . . . is made entirely from PURE VIRGIN WOOL PRODUCED IN SCOTLAND; that the wool was DYED by . . . and SPUN by . . . and that the tweed has been HANDWOVEN by . . . at his/her own home at . . . ." A specimen piece of tweed is attached to each declaration, and in the case of mill-spun yarn it is accompanied by the supplier's invoice. Thus the stamp—a transfer applied every few yards on the reverse side of the cloth—is a guarantee of origin. What is more, the Association supply labels marked with a serial number, so that even when made up into garments a tweed can be traced back to the weaver. The mainland producers' label and proposed trade-mark appears to provide for no such check.

The carrying out on the mainland of all production processes except weaving apparently enables the cloth to be marketed more cheaply, the differential probably being about 10 per cent of the wholesale price. It is difficult to understand why this should be so, because, while freight on raw wool, Glasgow-Stornoway, is about £6 per ton, that on yarn is almost twice as much. Even allowing for a loss of weight in spinning, this ought to give Stornoway mill-spun yarn an initial advantage over mainland spun. One can either conclude that, for some other reason, Stornoway mills are less economic than those on the mainland, or that they make an excessive profit on the spinning process. This is a matter worthy of further investigation in the long term interests of the whole Lewis industry.

Mainland carding, spinning, and finishing may appear logical economic developments analogous with the replacement of hand-spun yarn by mill-spun and of domestic "waulking" by mill finishing. And if, as seems possible, this type of tweed is able to capture the market and so put the Stornoway mills out of business and their workers out of employment, it may seem to some that this is no more than the inevitable continuation of a process which, at an earlier stage, brought about the demise of the domestic industry in its original home, Harris. If this view is accepted then, by the same principles, there will inevitably come a time when the expense of shipping yarn to, and tweeds from, the Outer Hebrides will no longer seem to be justified, for transport already adds several pence to the price of each yard of tweed. "Harris tweed" would then be no more than a name, of no more geographical significance than "cambric" or "Eccles cake," and what economic justification would there be of employing 1500 hand-loom weavers to perform what could be done more cheaply by a few men with power looms?

It has been argued, for the mainland mill producers, that their lower costs of production will induce increased sales and so lead to an over-all increase in the amount of work available for weavers in Lewis and, further, that such an increase would compensate for any decline in employment provided by the island mills. Three circumstances make this unlikely, if not impossible. Firstly, there is no guarantee that the market for Harris Tweed is sufficiently elastic. Secondly, the island mills already consume about one-third of the Scottish wool clip, not all of which is suitable for tweed; at most, therefore, Harris Tweed output could be little more than doubled. Thirdly, the value of the weaving process is but a small part of the value of the industry to the islands and, no matter how much more weaving was placed in the islands, it is unlikely that it could compensate the loss to the island of mill employment and producers' profits.

This last point is worthy of further consideration and to this end approximate costings of both types of tweed have been calculated (Table II). In detail the figures must be treated with reserve, because individual producers' costs vary a good deal, and there is the added complication that about one-third of the orb-stamped (i.e., island spun and finished) tweed is woven for "small producers" who buy yarn from, and send tweed (for finishing) to, the mills. The other two-thirds is woven directly for the mills, who thus compete with the very firms to whom they supply yarn. The figures apply to standard weight yarn and cloth; they can only be regarded as approximate, since costs must vary between one producer and another.

Two points emerge from the table: firstly, 50 per cent of the value of island spun—"orb" stamped—tweed already goes to the mainland (if cost of raw wool is taken into account), but if only weaving takes place in the islands, the island element in the tweed is reduced to 15 per cent. Secondly, if the present annual output of island producers (six million yards, or about 80,000 tweeds) were produced of mainland spun yarn for mainland producers, the annual value to the islands would be reduced from £1,800,000 to £500,000. In other words between three and four times as much weaving would have to be put out to make up the loss; this has been shown to be impossible unless overseas wool be incorporated in the yarn.

THE FUTURE—A SOCIAL, NOT MERELY ECONOMIC, PROBLEM

There is a social as well as an economic aspect to this problem. The establishment within the present century of an industry employing some 2400 persons in a situation as remote as Lewis is a remarkable achievement. Moreover, it has been largely achieved by men domiciled in Lewis, many of whom started on a small scale. One-third of the tweed stamped is still made for "small producers," but their numbers are declining. They are in a most vulnerable position: they must rely on the local mills for yarn and finishing, and the mills must make a reasonable profit on these processes; therefore the small producers' net profit margin is fine indeed, perhaps less than £1 per tweed. There is some feeling that the mills have not always been as helpful as they might have been and that their profit margin on yarn and finishing has been too great.[14] Be that as it may, it seems that

[14] The position of small producers is discussed at length in a *Report on the Harris Tweed Industry*, adopted by the Lewis Association, October 13, 1944, pp. 40–79.

TABLE II

THE "MAINLAND" ELEMENT IN THE COST OF A TWEED

Note: A tweed is taken to be 75 yards finished length and saleable, and to require 70 lbs. of yarn, being the product of 100 lbs. of greasy wool.

	A *Cost payable in:*		*B* *Cost payable in:*	
	Islands	*Mainland*	*Islands*	*Mainland*
Raw wool	£ 1.0	£18.0	Nil	£19.0
Carding, spinning, dyeing, etc.	£ 8.5	Nil	Nil	£ 8.0
Other yarn costs (including mill profit)	£ 0.8	£0.8	£0.2	£ 1.0
Cost of yarn	£10.3	£18.8	£0.2	£28.0
Warping and weaving	£ 6.0	Nil	£6.0	Nil
Finishing (including mill profit)	£ 3.5	Nil	Nil	£ 3.0
Selling agent's commission, insurance, labels, etc.	£ 1.3	£ 3.8	Nil	£ 3.3
Producer's profit	£ 1.0	Nil	Nil	£ 1.0
Producer's price	£22.1 plus £22.6		£6.4 plus £35.3	

A. Tweed woven from island spun yarn, all processes carried out in islands on behalf of island producers:
TOTAL COST ..... £44.7 *per tweed*
Island element, approximately 50%

B. Tweed woven from mainland spun yarn, all processes except weaving carried out on mainland on behalf of mainland producers:
TOTAL COST ..... £41.7 *per tweed*
Island element, approximately 15%

increased competition may force the small producers to abandon island spun yarn in favor of cheaper mainland spun. They would lose the right to the "Orb" stamp but, with commercial connections now well established, this might not be serious. If they did this then the quantity of cheaper tweed marketed by the mainland firms, including that woven in South Uist, and by the small producers would together provide serious competition for the island mills.

The dilemma which faces the mills is between their business as spinners and finishers and that as producers of tweed. If they are unwise they may lose both. Whatever the outcome, in the broader context of the long term welfare of the islands, the ultimate survival of both mills as employers and of small producers as a social group is important. The small and almost uniform size of crofts (very much smaller, on average, in Lewis than in other islands), and the absence of alternative outlets for enterprise and initiative, has in the past led to the loss by emigration of far too many of the younger and most intelligent men. The prospect of making a reasonable living as a weaver, without abandoning the family croft, and of building up a business from weaving to being a small producer, is one of the few such outlets. It is in the interests of the industry and of the islands that it should remain.

Scottish industry, lowland and highland alike, is continuously bedevilled by problems of location. Such industries as have overcome these problems have done so by specialization, often relying on a unique reputation as to quality, a reputation which in the mind of the buyer is closely bound up with geographical origin. Thus a natural disadvantage is turned to advantage. Harris Tweed is perhaps the extreme example of this. The reputation gained by products of cottage craftsmen has been transferred to those of large-scale industry. Even the location of the industry has to some extent been changed, although there can be no question that, for at least half a century, the name "Harris Tweed" has been generally accepted for Lewis or Harris tweeds.

It remains to be seen whether the train of events, set in motion 60 years ago by the first carding mills, and greatly accelerated by the use of mill-spun yarn in the 1920's, can be brought to a halt before all real connections with the Hebrides are severed or whether, in turn, island-spun yarn will be replaced by mainland spun. The Scottish countryside is littered with sorry examples of formerly prosperous establishments shut down once their products could be successfully imitated by more favorably placed competitors in the south or overseas. Industry cannot be expected to disregard economic considerations for those of social welfare, still less of sentiment, but can the reputation of Harris Tweed withstand a further, and severe, attenuation of its Hebridean associations? If such an attenuation is to be the cost of a further, short-term expansion then the long-term prospects of the industry maintaining its Hebridean, or even Scottish, location are poor indeed. To Scotland its loss would be serious enough; to Lewis it would spell economic and social disaster.

BOOK REVIEWS

Niveaux Optima des Villes: Essai de définition d'après l'analyse des structures urbaines du Nord et du Pas-de-Calais, by P. PINCHEMEL, A. VAKIL, and J. GOZZI. 117 pp.; maps, tables, graphs. CERES. (11th Cahier) (Faculté de Droit) Lille, 1959. Fr. new francs 37. 12¼ x 9½ inches.

Champagnole, by MICHEL CHEVALIER and PIERRE CHARPENTIER. 57 pp.; maps, graphs, bibliogr. (Cahiers de Géographie de Besançon, No. 8), Les Belles Lettres, Paris, 1960. 9½ x 6 inches.

Lyon: Ville Industrielle, by MICHEL LAFERRERE. XII and 544 pp.; maps (some folded in appendix), graphs, phot., bibliogr. and index. Presses Universitaires de France, Paris, 1960. 9½ x 6 inches.

Urban and metropolitan growth is coming fast to Europe. The exploding metropolis becomes a generalized phenomenon, though on a more modest scale as yet than in the United States. In France these trends have developed later than in several other Western countries, but are strongly felt since 1956. Urban studies are multiplying and becoming fashionable; and geographers are increasingly contributing to them. The three publications reviewed provide a good sampling of present methods and concepts. They deserve attention, for problems of urbanization will play a leading part in the economic concerns of France in the 1960's, opening to geographers an expanding field of activity with promising applications to city and regional planning.

The first publication reviewed is a report, prepared by a team of geographers and economists, for the CERES, a committee for regional planning and economic expansion of the North of France. The two *départements* forming this region used to be the major French industrial area besides Paris. Next to the Belgian border and the Straits of Dover, one of the main cradles of the industrial revolution, this area was France's façade towards the Low Countries and England. A century ago it seemed to be developing into a French Ruhr. Then some stagnation set in, especially in the earlier industrialized département of Nord, while more progress took place in the Pas-de-Calais. This report of the CERES concerned with the optimum frame of cities was the eleventh in a series, other volumes of which reported on industries (power supply; textiles; coal; iron and steel; transportation; etc.) or localities (Dunkerque).

It is interesting to note the concern for the *optimum* size, form, and function of the city in a region where no booming expansion is expected. The report examines cities of different sizes and types, their patterns of growth and specialization. Most of these cities are deeply inter-related and close enough to one another to form an urban constellation of which Lille is the main hub (though some of the cities studied, especially Calais and Boulogne, are still quite separate from such a conglomerate). The authors pay little attention, however, to that fact. They describe the region's urban development with a wealth of statistics, graphs, and outline maps, all aimed at comparing the various towns and classifying them into categories. This concentration on the individual city's shape and function is emphasized in the cartographic analysis of the cities' dynamism and of their position (pages 63 to 74). How valid is a comparison of the patterns of Lille on one hand and Roubaix-Tourcoing on the other that forgets to mention that the two urban growths are contiguous and in many ways interwoven? The same concern with the characterization of the individual city is maintained in the chapters describing social and administrative characteristics. The report even endeavors to quantify and integrate in its graphs such features as the comfort of the individual resident in the community and its prevailing social climate ("ambiance générale"). Such comparisons cannot be helpful if made for cities of very different sizes, and the report recognizes that (pp. 105–108); it still concludes with a classification based on each city's status with relation to the "optimum social structure."

As one reflects upon the practical significance of such classification, one must recognize that the authors did a fair job of evaluation; basically the final product of such processing of data depends on a preliminary thorough field study in which is first learned the relative value of the various statistical data available. Once this knowledge is acquired by the old, "subjective" ways of geographical surveying, the use of so-called objective data becomes easy and may lead to practical conclusions. In their last paragraphs the authors became aware of the implications for the distribution of social, welfare, and educational resources of the clustering together of many of the towns they considered separately. Thus they observe that 17 towns in the coal field

of Pas-de-Calais could be considered as one urban grouping aggregating over 600,000 inhabitants (p. 115). Similarly, the larger cities of Lille, Roubaix, and Tourcoing, with their satellite towns, should be recognized as a conurbation of more than 750,000 population. In such groupings a good deal of local specialization works itself out, resulting in complementarity between the constituent parts. Any regional planning and every characterization of urban communities must take these facts into account. Geographers cannot ignore such factors of distribution in space for the sake of using a statistical method, especially when they aim at defining a social optimum.

The study of Champagnole provides an interesting answer to the "optimum" question: this is a small but fast developing town in the picturesque Jura Mountains; its population doubled since 1920, reaching 7500 in 1960, while the other small towns in the area remained stagnant. The authors studied Champagnole's past and present very carefully; they believe the recently accelerated growth due to the local choice of specializing in more dynamic industries (furniture, toys, special alloys, and steel products) rather than to assets of location; they stress the advantages of a semi-rural environment and of social fluidity in the community. In conclusion the question is raised whether such smaller towns do present an "optimum" setting for developing modern manufactures. Similar towns in the neighboring areas of Switzerland are recognized as much more advanced towards such a social optimum.

The concern for better living conditions in growing urban communities constantly recurs nowadays in French economic and sociological studies. Geographers are increasingly aware of it, too, and they are well prepared to deal with such interests owing to the traditional approach studying the city's or region's "personality" and also owing to the comparative geographical method. Paramount in recent European economic research is, however, another concern: that with the relative importance and influence of the various *factors of growth*, especially on the local scale. This is apparent in various recent studies of urban and industrial questions even in books which are regional monographs, such as *Les Régions de l'Est* by André Blanc, Etienne Juillard et al., (Paris, Presses Universitaires de France, 1960) or, in the same series, *La Région Lyonnaise*, by Jean Labasse and Michel Laferrère.

The study of the industrial agglomeration of Lyon by Michel Laferrère is of a completely different nature. This young and talented geographer knows thoroughly his area and its industries. He certainly has not missed a single plant of importance; but three categories of manufactures are studied with special care: first, silk, the older specialty of Lyon; secondly, the mechanical and electrical industries; thirdly, the rapidly developing chemical industries. These three large monographs make up the main body of the volume; they are preceded by an interesting analysis of the distribution of manufacturing within the city and in its suburbs (pp. 18 to 80), and this tableau is illustrated with three large maps folded as an appendix in the back of the volume and a large table giving the spaces occupied by various categories of manufacturing establishments in the conurbation of Lyon (i.e., 57 municipalities) in 1959.

Lyon, now the third city and conurbation of France, is essentially a great manufacturing center; in terms of financing and upper level management it has resigned itself to the supremacy of Paris where policies are shaped and decisions made. In its present specialization Lyon is now thriving; in recent years its expansion has gained new momentum. One can hardly account for these developments without reference to the location of Lyon at a major crossroads of natural thoroughfares. The importance of this location, already recognized by ancient Gallic tribes and Roman strategists (as noted by Julius Caesar), may well have been revalued by the European Common Market, the proximity to northern Italy, southern Germany, and even prosperous Switzerland. Within the French national framework, the eastern half of the country, in the center of which Lyon is situated, is now developing much more impressively than the western half.

Such considerations are barely mentioned in Laferrère's study. In his interesting, and to this reviewer's taste too brief, introduction and conclusion, the fundamental reasons given for the city's industrial success are managerial: the quality of entrepreneurship, industrial organization, interest for research, the spirit of initiative and innovation. All these are undoubtedly and always have been important factors of the localization of economic activities. Because they are difficult to quantify or to incorporate in models, they have often been overlooked in recent research on industrial localization. But is the spirit of the local community enough to mold the facts of economic geography? Or should we also consider the determining influence on the local spirit of changing circumstances in a wide world of which a city, whatever its size, is only a small part?

The momentum of Lyon's manufactures constantly feels the impact of forces beyond the control of the local residents. In fact the managerial dependence on Paris alone could demonstrate it. It is true, however, that the policy-makers in Paris have to choose at every step between Lyon and other possible locations. The resourcefulness of the place as expressed in entrepreneurship and technology is a weighty factor in such decisions. This kind of problem reaches deep in the fundamental principles of the distribution of economic activities. It is refreshing to see a case thus presented for our

reflection of a large industrial growth which it may be far too easy to explain on the sole grounds of geographical location.

JEAN GOTTMANN

Ecole des Hautes Etudes, Paris

Final Report, Chicago Area Transportation Study. Vol. I, *Survey Findings*, xiv and 126 pp.; Vol. 2, *Data Projections*, xi and 133 pp. Chicago Area Transportation Study, 1959 and 1960. No price. 12 x 8½ inches.

The Federal Interstate Highway system, comprising 41,000 miles of express highways authorized in 1956, is now over one-fifth completed. The early stages of construction of that system have focused attention on the observable and potential effects of modern highways and the patterns of population and economic activity in all regions affected by the expansion of the national highway net, and especially upon the structure and pattern of urban and metropolitan areas, where a substantial proportion of the highway investment is being placed.

As early as the 1940's, many urban areas, with financial aid by the U. S. Bureau of Public Roads, conducted several so-called origin-destination studies, which proved to be invaluable in the planning of changes and extensions of the highway and street systems. A major shortcoming of such surveys, however, was that they produced "desire lines" and other projections based only upon the then-existing patterns of population, business, and land uses within the respective areas. While the reports of such studies usually contained generalized land-use maps, the relations among various combinations of land uses and the traffic-generating characteristics of the individual types of land uses were not directly studied in a manner that would enable significant projections to be made.

More recently, a series of general transportation studies of major metropolitan areas has been carried out, with technical and financial co-operation of federal, state and local governments, using methods which amplify and extend the kinds of information obtained by the older type of origin-destination study. Comprehensive transportation studies of the newer type have been completed for the Detroit and Washington metropolitan areas, and are now under way in the Pittsburgh and Philadelphia (Penn-Jersey) areas. Noteworthy among these studies is the one now being completed for the Chicago region.

In addition to many individual technical monographs which have appeared over the past five years, setting forth both the techniques and the results, the Chicago Area Transportation Study is producing a Final Report in three volumes, of which the first two have appeared. The first volume contains the major findings of the study, the second projects the data to the year 1980, and the third volume, to appear late in 1961 or early in 1962, will contain a proposal for a comprehensive plan for internal transportation facilities within the Chicago region. To produce these reports, the various governments have spent over two million dollars, and a permanent staff is to be retained to keep the studies up-to-date. In terms of the total investment in facilities, the planning of which will be aided by these reports, the cost is indeed small.

Volume I contains a description of the study and the study area, and a detailed discussion of the land use pattern. A series of multiple-color maps shows the individual types of land uses within the region as well as the composite land use pattern. Other maps show population distribution and the sequence of development of the various sections of the region since the first settlement. This section of the study is based primarily upon a land use inventory made in 1956, in which the land areas and floor areas of each type of use were tabulated by square mile sections. Three-dimensional models, photographs of some of which are included in the report, vividly portray these patterns. Particularly prominent is the continuing dominance of the central business district as a center of high-density land uses, high land values, and intensive trip generation. The density-gradient outward from the Loop is set forth in a series of tables and graphs which reinforce our traditional concepts of urban and metropolitan structure.

To obtain information on travel patterns, home interviews were conducted at every thirtieth dwelling unit in the survey area, relative to all trips made by residents of the unit on the previous weekday. These were supplemented by samplings of truck and taxi trips, by roadside interviews of a sample of the traffic entering and leaving the cordon around the survey area, and by a sample of railroad travel to and from the survey area. A total of over 135,000 interviews was obtained, covering a universe of more than 10,000,000 person trips and 6,000,000 vehicle trips. By means of text, maps, and tables, the first volume portrays the metropolitan pattern of travel, by vehicle type, purpose of trip, time of day, distance, type of land use at origin and destination, and location within the survey area. Trip generation is related to characteristics of land uses, for each zone within the survey area, and to population characteristics, including residential density. A novel electronic device, the "cartographatron," was developed especially for the survey, and a series of desire line tracings showing the patterns of trips of various characteristics is reproduced. These patterns vividly show the concentrations of traffic demand, and bring out clearly the nodal areas within metropolitan

Chicago, where each type of traffic is generated. The final chapter of Volume I relates the travel patterns to the existing inventory of highway and mass transportation facilities. A technical appendix contains a more detailed discussion of the methods used in the survey and in the interpretation of the results, together with a series of tables giving the land use and traffic generation characteristics of each zone within the survey area.

Volume II projects the survey results to the year 1980. Unlike most previous transportation studies, the Chicago Area Transportation Study does not simply present an expansion of the existing pattern of travel desire, but rather uses present relationships among land uses in terms of their traffic generation characteristics as the basis for projection of future traffic patterns, with consideration being given to other factors affecting a land use plan.

The volume opens with a discussion of past trends in the metropolitan land use pattern and in population growth as well as of employment and other economic factors. A critical consideration is the growth of automobile ownership and use, which, of course, will be a major determinant of the future urban pattern. The report contains an interesting series of synoptic maps showing the extent of the built-up area during past periods having differing transportation patterns, including the horsecar period, the electric streetcar period, and the period in which suburban railroads were of major significance. From this, the report proceeds to a forecast of land use patterns in 1980. In developing the forecast, the survey staff assumed no major changes in most of the currently built-up area. They reached the conclusion that ". . . the expectation for 1980 is for stability in the completely built-up parts of the urban region—stability in number of residents and in the intensity and proportional uses of land. The only exceptions are the major redevelopment or renewal projects. Most of these actually represent a replacement of presently outworn structures and are designed to accommodate similar land uses. An outstanding exception . . . is the rebuilding plan for the central area." For the central area, the plan published by the Chicago Department of City Planning was assumed to have been carried out by 1980. For vacant land, projections of population and land requirements for the various types of uses were made, and allocations were made in accordance with judgments of the staff. In these judgments, of course, consideration was given to the reciprocal relationships between land use and the location of existing and authorized transportation facilities. The final volume of the report, now in preparation, will propose specific additions to the transportation system.

The material in Volume I and the introductory portions of Volume II constitute invaluable information, not only to transportation and urban planners but also to urban geographers, as they furnish a detailed description of a metropolitan pattern of land use, transportation facilities, trip generation, and the interrelationships among these factors. Many cross-tabulations are provided, and many others can be made from the data available. In spite of a series of parallel research papers and monographs prepared over the last five years by the Chicago Area Transportation Study staff, a veritable gold mine of information remains. The survey is of monumental proportions.

However, one major problem remains yet unsolved: the co-ordination of the survey results, and particularly of the plan recommendations which are now under consideration as the preparation of the third and final volume proceeds, with the parallel efforts of the city and metropolitan planning agencies. Particularly significant among them are the Northeastern Illinois Metropolitan Area Planning Commission, which began studies in 1959, that, it is hoped, will eventually lead to a comprehensive plan; and the Department of City Planning of Chicago, which is preparing a general plan for the city, to be published late in 1963 or early in 1964. It is to be hoped that the plans of these two agencies, in particular, as well as the more detailed plans of hundreds of suburban municipalities and eight metropolitan counties, will reinforce and complement one another rather than conflict. It is not too late for the Chicago Area Transportation Study, the city and metropolitan planning agencies, and the many planning groups concerned with smaller areas, to work out compatible, rather than conflicting, plans.

HAROLD M. MAYER
University of Chicago

The Human Use of the Earth, by PHILIP L. WAGNER. xv and 270 pp.; maps, diagrs., notes, index. The Free Press, Glencoe, Ill., 1960. $6.00. $8\frac{1}{2} \times 6\frac{1}{2}$ inches.

This is an enormous subject for a small book, and it may be that all of the fault I find with Professor Wagner's book stems from that difficulty. He aims to show "man as the inhabitant and beneficiary of artificial environments, created by human effort . . . ," "how different human cultures and social arrangements express themselves in artificial features of the landscape, and how these man-made installations affect the life conditions of human individuals and the natural features of the earth." His premise is that "there is an order and regularity in the geography of man's works," but we need "a comprehensive and consistent way" of looking at the profusion of data. Professor Wagner is to be congratulated for tackling this problem; his theme and his approach deserve

interest and sympathy. But I finish his book feeling almost that I have read some 250 pages of nothing. He says too little about anything to tell us much of value, and too much to be free of the charge of superficiality or even of meaninglessness. Most of the time the book seems to be laboring and complicating the obvious, or making grand the trivial, in the name of a "theoretical structure" which simply does not emerge. We are told that most plants are stationary but that most animals are mobile, that field mice store food, that men live longer and are stronger than insects, that intelligentsias have been the spearhead of change, that toolmaking is peculiar to man, that "to dig a mine, a body of ore must be present," and that factories also consume things and require transport.

> "The behavior of man that affects the physical world must be physical behavior no matter what other influences play upon it. Learned habits (culture) influence behavior but it is only its physical characteristics that can explain its physical effects. Furthermore, the behavior that affects the physical world is that of individuals; and though the effects of individuals' behavior are contingent on each other's acts, complementary to them, and cumulative with them as organized within societies, the individual is the unit of action. Only those influences that affect the individual can explain his behavior or, taking all individuals together, the effect of a whole society's behavior" (p. 26).

I cannot see that this is really worth saying, and I do not think it is unfair to say that it is thoroughly typical of the book as a whole. Similar passages could be found almost at random on almost any page: for example, on page 122, "We shall refer to that portion of the artificial environment where human beings actually live as settlements"; or, on page 204, "Almost any industrial product in a producers' economy is passed through many different stages of storage, transport, and manufacture . . . "; or, on page 139, "Cultivated land is land where crops grow or animals feed, by our definition" but "there are large areas where plants simply are not cultivated"; or, on page 132, speaking of "personal travel," ". . . trains are rapidly giving way to airplanes in Western countries, because of their lesser speed."

Such statements are usually not related to anything else beyond the level of the obvious, and are not simply introductions to a larger discussion. There is no breaking of new ground anywhere in the book on the level of information, and none that I can perceive on the level of theory or of generalization. There is a thread of an Aristotelian attempt at classification and typology, without Aristotle's rigidity but also without his value for contemporary scholars. This is clearly not intended as a textbook, but it is difficult to see for whom it is intended. The effort at classification yields a number of terms whose usefulness is questionable, for example, "obligate" and "facultative" symbiosis, or a series of terms for different types of capital (a "taxonomy of capital"—see pp. 95 ff., in which we are told that "some things, like ditches, may belong to several of these categories at once"). This kind of analysis, it seems to me, more often obscures than clarifies meaning. Much of the book appears almost to try to avoid saying anything useful, an elaborate dance around reality and meaning. This is not because the concrete is avoided; there is plenty of that, but it seems almost random; perhaps there is too much to permit Wagner to talk usefully in abstract terms, but when he does reach for abstractions he seems to be beating the air:

> "The great bulk of industrial machines in Western countries today is composed of power machines and their refinements" (p. 100); or "In modern peasant countries, the peasants are not nearly so dependent on the market or the state distributive agencies as are the folk of the cities" (p. 74); or "Circulation routes . . . always come from somewhere and go to somewhere" (p. 130); or "The locations at which work takes place are those at which appropriate tools are present or can be assembled, to which materials can be brought, workers can come, and from which the product can conveniently be moved toward those who consume it" (p. 77); or "Any organism which does not make sufficient and appropriate provision for survival must perish. At almost all places and times, human standards of consumption have lain well within the biological limits for survival; any standard otherwise conceived would soon disappear, along with those who held it" (pp. 27–28).

I do not want to be unfair, but I do not get the point.

Chapter 8, "Ways of Livelihood," does flicker into a sort of half life, but it does not tell us anything we have not heard before, and the book dies again with Chapter 9 on "The Commercial Environment," or relapses into the never-never land characteristic of the book as a whole. One final example of the concrete material, from the concluding chapter titled "A Geographic Outlook":

> "In the mountains of Oaxaca, where the people are intermittent subsistence cultivators, the patchy disturbance of the vegetation shows their touch. Cultivated plots are evident. Thatched villages with whitewashed public buildings stand out. Rough but passable trails wind through the hills. Not far distant, however, in the Valley of Mexico, the smokestacks of factories contribute their share of particles to the general haze. Airplanes drone in the sky, and trucks and busses whiz along the highways. The countryside around the city is strewn with refuse and dotted with countless pepper trees, an imported species,[2] and with crumbling

> adobe walls and battered buildings. Day and night, there is traffic on the roads. At night lights are dim and distant in the country, bright and colorful in the city. The Valley here and there has bright green spots where maize is growing. One senses that a larger world stretches continuously beyond (p. 233).

This is not taken out of context, in the sense that I can find no context. What precedes and follows it takes us no further either toward the concrete or toward the abstract, except to make the obvious point, in a single sentence, that "These striking differences of environment reflect above all the dissimilarity of the societies concerned." For pleasure, for information, and for understanding I would rather read D. H. Lawrence's *Mornings in Mexico*.

The book finishes with fifteen numbered points headed "Conclusions and Observations." Number 6 is typical of them, and of the book:

> "The increase of artificial control of nature by man is related to increasing variety and elaboration of the symbiotic relationships in which men participate."

The Human Use of the Earth is a disappointment, but the idea behind it is attractive and important. Professor Wagner will probably be heard from again on this subject, and more usefully.

Turning on the publisher, how much longer must scholars put up with the practice of lumping footnotes at the ends of books simply because it is cheaper? It would also be cheaper, and in many cases less annoying, to leave the notes out altogether.

RHOADS MURPHEY
University of Washington

THE STAFF

Editor, RAYMOND E. MURPHY
Assistant Editor, J. W. BIRCH
Managing Editor, SAMUEL VAN VALKENBURG

Associate Editors

CHARLES C. COLBY
EUGENE VAN CLEEF
EARL B. SHAW
HENRY J. WARMAN
CLARENCE F. JONES
NELS A. BENGTSON
GEORGE B. CRESSEY
OTIS W. FREEMAN

Cartographer

GUY H. BURNHAM

CONTRIBUTING EDITORS

CARLETON P. BARNES, United States Department of Agriculture, Washington, D.C.

HANS BOESCH, University of Zurich, Switzerland

LOYAL DURAND, JR., University of Tennessee, Knoxville, Tennessee

EDWIN J. FOSCUE, Southern Methodist University, Dallas, Texas

OTTO E. GUTHE, United States Department of State, Washington, D.C.

OLAF JONASSON, University of Gothenburg, Sweden

HAROLD H. MCCARTY, The State University of Iowa, Iowa City, Iowa

L. DUDLEY STAMP, London School of Economics, England

GRIFFITH TAYLOR, Seaforth, N.S.W., Australia

C. LANGDON WHITE, Stanford University, Stanford University, California

CLIFFORD M. ZIERER, University of California, Los Angeles, California